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QUARTERLY REVIEW of SURGERY

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QUARTERLY REVIEW of SURGERY

Vol. 1 No. 2 February 1944

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FOREWORD

BEGINNING with the May 1944 issue, the Quarterly Review of Surgery will classify all abstracts of articles and references under the headings indicated in the following systematic plan:

Anesthesia and Analgesia
Pre- and Postoperative Therapy
Surgical Technic
Surgical Infections
Tumors
Neurosurgery
  Skull
  Brain
  Spine and Spinal Cord
  Peripheral Nerves
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Head and Neck
Oral Surgery
Plastic Surgery
Thyroid and Parathyroid
Thoracic Surgery
  Chest Wall
  Pleura
  Lung
  Mediastinum
  Heart
  Esophagus
Breast
Diaphragm
Abdominal Surgery
  Abdominal Wall
  Hernia
  Peritoneum
  Stomach and Duodenum
  Small Intestines
  Appendix
  Colon and Rectum
  Intestinal Obstruction
  Anus
  Liver and Biliary Tract
  Pancreas
  Spleen
Genitourinary Surgery
Gynecologic Surgery
Vascular Surgery
  Arteries
  Veins
Orthopedic Surgery
  Fractures
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  Bones
  Joints
  Tendons
  Amputations
Traumatic Surgery
  Burns
  Shock
  Transfusions
  Wounds
Military Surgery
Experimental Surgery
Miscellaneous

It is believed that this plan will assist the reader to locate quickly the articles of current interest and will prove most helpful in making readily available the references necessary in the compilation of bibliographies on surgical subjects. Under each classification, immediately following the abstracts, there will be published the references to current articles not abstracted.

The decision as to whether an article is to be abstracted, or only the reference published, will depend on many factors. Frequently two, or more articles are published on the same subject in different journals, at about the same time. When this occurs we believe it would better serve our readers to list the references of articles in the journals of wide circulation and to abstract the articles from publications or sources not so generally available.

The suggestions and comments of our readers will be gratefully received.

HENRY N. HARKINS, M.D., *Department of Surgery*
Johns Hopkins Hospital, Baltimore, Maryland

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Surgery of the Thorax

THE PROBLEM OF WOUND INFECTION IN THORACOPLASTY

Y. K. Wu and Mario Besso Pianetto

Peiping, China Argentine Republic

J. Thoracic Surg., 12:648-58, Oct. 1943

Wound infection is a serious complication in thoracoplasty for pulmonary tuberculosis. The mortality rate has been estimated as 25 per cent in cases of deep infection, even with early proper treatment. In less severe infection, the delay between stages usually results in unsatisfactory collapse. Therefore it is highly important for thoracic surgeons to take every precaution to avoid the development of this complication. Precautionary measures include the elimination of contamination, operative procedure, postoperative care of the wound, and the general treatment of the patient. Besides gross break in technique the two chief

sources of contamination in a clean surgical incision are the patient's skin and the air in the operating room, the predominating organism in both cases being staphylococci. The following methods are suggested to minimize contamination from these sources. Several days before the operation the patient's back is cleansed with soap and water, and on the evening before operation, besides the usual shaving, the entire side of the chest is gently but thoroughly scrubbed with soap and water for five minutes. The scrubbing is repeated in the morning just before the patient is sent to the operating room. The skin of the operative field is treated with ether, 3.5 per cent tincture of iodine and alcohol. As soon as the skin and subcutaneous tissue are incised, all the skin surfaces on both sides of the wound are covered with thick absorbent pads, held in place by the weight of the hemostats in the wound. Sterile towels are then applied over the pads. These are removed after the muscles and fascia are closed at the end of the operation. The skin is treated with alcohol before the skin sutures are applied.

Air contamination may be avoided by radiating the air in the operating room with ultraviolet light. Marked reduction in the incidence of wound infection has been noted by those using this procedure. In the absence of such special installation, the authors use two mechanical means. First the wound is covered with towels in such a way that only the area necessary at certain stages of the operation is exposed to the air. The towels are changed at frequent intervals. At the end of the operation the entire wound surface is irrigated with a large amount of warm normal saline.

In the operative procedure injury to the soft tissue of the chest wall can be avoided by care and sacrifice of unnecessary speed. The divided muscles are protected from the pulling and pressure of the retractors with moist pads and towels. At the end of the operation all the loose soft tissue tags are removed before the wound is closed. Closure of the wound is effected by a first layer of interrupted sutures of No. 0 chromic catgut for the muscles, a continuous suture of No. 000 chromic catgut for the subcutaneous fascia, and interrupted sutures of "A" silk for the skin. The smallest size of suture material that gives strength enough to hold the wound should be chosen, and the whole amount of suture material should be reduced to a minimum. Hemostasis is therefore

secured by including the clamped bleeding spots in the muscles and fascia in the closing sutures. Accumulation of sanguineous fluid in the wound may be removed by aspiration. As a rule thoracoplasty wounds are not drained. A pressure dressing by the use of mechanic's "waste" is applied at the end of operation. Moderate pressure is applied. In a first stage thoracoplasty, the dressing need not be disturbed until the sixth day, when the skin stitches are removed. In the subsequent stage operations a change in the dressing is usually required on the second or third day. In the presence of hematoma, blood is removed by aspiration. Reopening of the incision is indicated only when there is definite sign of infection.

In the immediate preoperative period, a high protein diet with additional vitamins should be prescribed. The same regimen is continued as soon after operation as possible. A blood transfusion of 500 cc. is given at the end of each operation and this undoubtedly helps in promoting wound healing and hastening the recovery of the patient. The authors have proved the validity of these precautions in a series of 120 stages of the operation without a single case of infection. 6 references. 2 tables. 2 figures.

SOME OBSERVATIONS ON EIGHTY CONSECUTIVE CASES OF INTERNAL PNEUMONOLYSIS

R. S. Barclay

Ruchill Hospital, Glasgow, Scotland

Edinburgh M. J., 50:554-57, Sept. 1943

Thoroscopy with division of adhesions was done in 80 patients; as some patients required more than one thoroscopy, there were 103 operations in this series. The double puncture method of thoroscopy under local anesthesia was employed. The cautery was used for division of adhesions. The operation of thoroscopy was indicated in 57 patients because artificial pneumothorax failed to collapse a cavity that was "held out" by adhesions; and in 23 cases because adhesions prevented a concentric collapse of the lung which still contained active disease. In 50 cases, or 62.5 per cent,

the adhesions were completely divided, and the disease was successfully controlled by collapse; in 8 other patients while the adhesions were not all completely divided, the disease could be successfully controlled; this gives a satisfactory result in 72.5 per cent of cases. In 12 cases the adhesions were only partially divided and the disease process was not controlled; and in 10 cases no division of adhesions was possible because of fusion of the lung to the chest wall. In most cases the patient was but little "upset" by the operation; purulent effusion developed in only one case; serous effusion in 10 per cent; there was no hemorrhage or other complication in this series. The author is of the opinion that internal pneumonolysis should be employed in many cases in which artificial pneumothorax is ineffective; it is a safe procedure, the benefits of which "far outweigh" the possible complications.

PNEUMONECTOMY IN PULMONARY TUBERCULOSIS

HEINZ J. LORGE (Lieut., A.U.S.) and PAUL DUFAULT

Rutland State Sanatorium, Rutland, Mass.

Am. Rev. Tuberc., 48:229-36, Oct. 1943

Pneumonectomy has been employed more frequently in nontuberculous lung conditions than in pulmonary tuberculosis. The authors report 3 cases in which this operation was done because of bronchial stenosis, which caused wheezing, retention of sputum, and frequent "bouts" of uncontrollable cough, fever and malaise followed by copious expectoration. In none of these cases was bronchoscopic dilatation possible; and total pneumonectomy was done, as the bronchial involvement in all cases was too extensive to justify lobectomy. The first patient was acutely ill at the time of the operation; three months after operation the remaining lung showed progressive involvement and the patient died six months after operation; there was definite improvement in the patient's condition after operation before active disease developed in the remaining lung. In the other 2 cases the condition in the resected lung was of a more chronic type, and lesions in the opposite lung were entirely inactive at the time of operation. Both patients had had a thoracoplasty previously; in one case the thoracoplasty had

been done ten years before pneumonectomy. In one of these cases, the remaining lung showed "a not very active lesion" six months after pneumonectomy, but this has showed evidence of clearing under sanatorium treatment during the past seven months. The third patient has been free from symptoms for eleven months since operation and the remaining lung shows no evidence of activation. In the authors' opinion, pneumonectomy will have "a definite place" in the treatment of pulmonary tuberculosis, as the indications for the operation are fully realized, in spite of its dangers and possible complications.

SIMPLE DRAINAGE OF INTRATHORACIC SUPPURATIONS, USE OF AN ENDOCUTANEOUS (ELOESSER) FLAP

A. LINCOLN BROWN (Lieut. Commander, M.C., U.S.N.R.)

San Francisco, Calif.

Am. J. Surg., 62:169-84, Nov. 1943

The flap operation for drainage was done in 54 cases of tuberculous and non-tuberculous empyema or for drainage of tuberculous cavities. In 29 cases, the flap operation was the first method of drainage used (except possible thoracentesis). In 24 cases the flap operation was done after other forms of surgical drainage had been employed, such as tubes or rib resections; in one case the patient's history was incomplete in regard to any previous treatment. The flap operation is done under local anesthesia, usually combining field blocks and intercostal nerve block, with the patient in essentially the same position as for artificial pneumothorax. The site selected for the flap is in "the most dependent position of the cavity to be drained." If possible, the base of the flap is parallel to the line of the ribs; any existing scar tissue or sinus tract is excised; scar tissue should not be included in the flap, but an old thoracotomy scar may be used as one border of the flap. The flap is fashioned of "full thickness skin," about 12 cm. in length, and tapering from a width of about 6 cm. at the base to about 4 cm. at the tip. A section of rib, 3 to 4 cm., and underlying thickened pleura is removed approximately under the center of

the flap, so as to allow enough flap tissue to be turned in and sutured to the parietal pleura without tension; No. 1 chromic catgut is used for this suture. All secretions in the pleural space are aspirated before the flap is fixed in position. The flap is handled "gently," but no attempt is made to obtain complete hemostasis, as this might "jeopardize the viability" of the flap tissue. The wound edges are "approximated" with nonabsorbable sutures, but the wound is not closed too completely as this might "seal off" the opening. No tubes are used, but a vaseline gauze dressing is placed over the wound and ABD pads applied, the dressings being changed as frequently as the amount of drainage makes necessary. As the drainage diminishes, several layers of gauze may be used instead of the pads. A jacket with an oiled silk "pocket" to hold the pads or gauze directly over the wound has been employed and obviates the continual use of adhesive. The flap allows free drainage from the pleural cavity, but has a valve-like action which prevents the entrance of air, and thus maintains a negative pressure; if the negative pressure is so great that it causes discomfort, a small catheter can be inserted which relieves the valve action and equalizes the intrapleural pressure. The skin sutures are left "until they almost slough out," as the wound edges are unavoidably infected by the drainage. However, healing of the wound usually takes place in about ten days "without further interference." Of the 54 patients operated on by this method, 46 were definitely improved, 20 of them immediately after the operation; 8 were not benefited. One of these 8 patients died twenty-four hours after operation; this patient was "practically moribund" when the operation was done; another patient whose flap had not functioned well died several months after the flap operation from metastatic purulent meningitis following a radical thoracotomy. The empyema cavity became smaller in 29 cases, in 11 of which it was completely obliterated; in 10 of the cases with bronchopleural fistula, the fistula closed completely. Secondary operations were subsequently done in 10 cases. The flap operation was found to be of special value in cases of intrathoracic suppuration in which other methods of drainage failed to benefit the condition; it was also of value as a primary method of treatment especially in cases of mixed tuberculous empyema and for the direct drainage of

tuberculous cavities. This method of drainage requires "practically no after care," which is of definite value at any time, but especially in the present emergency which places both civil and military medicine under stress.

SULFONAMIDES AND PLEURAL EFFUSION *(Sulfamida y derrame pleural)*

EDMUNDO FERREIRA DO NASCIMENTO

Rio Grande do Sul

Semana méd., 50:1059-62, Nov. 4, 1943

Not having seen any reference in his country to the use of sulfa drugs intrapleurally for purulent pleural effusions or prophylactically following the Jacobaeus operation, the author feels justified in reporting three cases of purulent pleural effusion, one following a Jacobaeus operation and the two others the result of poorly managed pneumothorax. Inhalation of sulfonamide vapors has given good results in certain bronchopulmonary affections. Intrapleural administration of sulfonamides has been used for streptococcic pleurisy and metapneumonic purulent pleurisies. The author used albucid in his cases, 5 cc. three times a week, without any toxic manifestations or manifestations of intolerance. The three cases of purulent pleurisy occurring during therapeutic pneumothorax here described failed to respond to simple puncture. Following the treatment with albucid, not only the effusion disappeared but the lungs re-expanded. 8 figures. 6 references.

PRINCIPLES UNDERLYING THE OPERATIVE APPROACH TO THE TREATMENT OF MYOCARDIAL ISCHEMIA

CLAUDE S. BECK

Western Reserve Univ. School of Medicine, Cleveland, Ohio

Ann. Surg., 118:788-806, Nov. 1943

The surgical treatment of myocardial ischemia resulting from coronary artery disease is based on the theory that coronary artery

disease is similar to epilepsy in that it results in the establishment of a zone of anoxemia in the myocardium which is a "trigger" zone; when this "trigger" zone "fires" or discharges, it produces incoordinated contractions and relaxations of the heart muscle, "the well-known 'heart attack' which is fatal." The object of the operation used by the author is to supply a small amount of blood to the zone of anoxemia to prevent the "firing" of the "trigger." This is done by producing an inflammatory reaction in the myocardium which increases its vascularity and the flow of blood. For this operation nitrous oxide anesthesia is used; the anesthesia is light so that the patient becomes conscious immediately after the operation. The incision is curved along the left border of the sternum over the fourth, fifth and sixth costal cartilages, which are removed completely; a few centimeters of each of these ribs are also removed. The pericardium is roughened by special burs; powdered asbestos, 0.2 gm., is then applied, some being rubbed into the parietal pericardium and some mixed with saline and "dripped" on the heart and along the mammary artery and vein. Mediastinal fat is then brought into contact with the heart through openings in the parietal pericardium; and the parietal pericardium is sutured to the chest wall so that "the heart and the pericardium are in contact." In closing the wound, air in the left pleural cavity is removed by suction and no drain is used. After operation the patient is placed in an oxygen tent and fluids are given intravenously in amounts of 3 to 5 liters daily. Quinidine is given both before and after operation in doses of 5 grains after a test dose of 3 grains.

This type of operation is not indicated in advanced cases of coronary sclerosis; the best results are obtained in cases in which destruction of the myocardium is relatively slight. Patients may be selected for operation whose clinical course is "either horizontal or declining" for a period of several months. Of 30 patients with coronary artery disease who have been operated on all who recovered from the operation were partially or completely relieved of pain. Their ability to "get around" and to work has been increased; some are even doing hard physical work. One patient, who was much improved by the operation and able to work as a salesman, died two years and three months after operation from

cerebral hemorrhage; at autopsy a number of vascular communications were found between the heart and "the grafts."

SURGICAL PROCEDURES IN CASES OF HEALED OR HEALING MYOCARDIAL INFARCTS

F. A. WILLIUS

Rochester, Minn.

Proc. Staff Meetings Mayo Clinic, 18:374-76, Oct. 6, 1943

In contemplating surgical procedures in cases of healed or healing myocardial infarcts, the surgeon has to consider the imperative nature of the surgical condition and the status of the heart and its probable response to the contemplated surgical procedure. The complicating disease must be of such importance that the life of the patient is without doubt threatened if the disease is not attacked surgically. Among such conditions may be mentioned carcinoma, prostatic obstruction, peptic ulcer (obstructive, perforative or hemorrhagic), acute gangrenous cholecystitis, obstruction of the common bile duct, acute gangrenous appendicitis, obstruction of the intestine, strangulated hernia and so on.

Numerous factors must be carefully appraised from the standpoint of the heart itself, especially the interval of time which has elapsed since the abrupt closure of the coronary artery occurred. An infarct is not converted into a well-condensed cicatrix in less than three months, and at this time the production of collateral circulation in reality has only begun. Months and even years are often required before the vascular adequacy of the heart has been restored. In some cases this is never achieved. The incidence and recurrence of the anginal syndrome will indicate that collateral circulation is not adequate.

Whenever possible it is desirable to permit a year to elapse before operation is attempted. If emergency conditions requiring operation arise, one must either decide to operate and accept the added risk after an understanding with patients and relatives has been reached, or not to operate and accept death from the com-

plicating disease. The operative risk is grave when only a short time has elapsed since coronary closure. For this reason the scope of the operation should be limited as far as possible, and the time for operation shortened to a minimum, for even slight degrees of surgical shock and the type of anesthesia may be determining factors for life or death. The type of anesthesia to be selected will depend upon individual factors in each case. Also postoperative management must be cautiously individualized. Little is to be gained by preoperative cardiac treatment except in congestive heart failure in which operation can be considered only after cardiac function has been reasonably restored.

PRECARDIAC THORACECTOMY AND HEPATOPEXY IN ASCITES DUE TO ADHESIVE PERICARDITIS

(Thoracectomie précardiaque et hépatopexie dans l'ascite par péricardite adhésive)

HENRI CURCHOD

Lausanne

Helvetica Med. Act., 10:269-79, June 1943

In a series of four cases of pericarditis treated by Brauer's surgical technic, the author experienced one death and three ameliorations but no complete cures. He reports in detail another case in which complete cure was obtained by an operation performed in conjunction with Brauer's operation. He draws attention to the embarrassment of circulation of blood in the inferior vena cava tightly compressed in its fibrous diaphragmatic orifice by pericarditis and mediastinitis. The superior vena cava is likewise compressed by mediastinitis. This obstacle to circulation is rarely mentioned. Hanot, however, has drawn attention to the fact that early hypertrophy of the liver in the symphysis may develop from traction by adhesions on the inferior vena cava. Modern cardiologists attach great importance to this poor function of the venae cavae, which are inaccessible to surgery. In the method devised by the present writer these veins are indirectly relieved. A case is described in detail in a youth of 21 years of age. Following

a Brauer operation, ascites recurred. His general condition was satisfactory and there was marked improvement but the musculature was weak and the heart rate always rapid, 108, with a maximum blood pressure of 11 and a minimum pressure of 7. But neither rest nor diuretics influenced the ascites, which recurred regularly. The thirteenth puncture yielded 8.650 liters. It was decided to try a Talma operation. However, the omentum was found thin as tissue paper and already adherent to the parietal peritoneum in several places, due possibly to the multiple punctures. Thus a Talma procedure had been accomplished spontaneously. The third, fourth, fifth, sixth and seventh costal cartilages were resected. The xyphoid appendix of the sternum was likewise resected and the anterior insertions of the diaphragm were detached. This was followed by transverse incision of the parietal peritoneum, liberation of the peritoneum, and preparation of a niche to receive the left lobe of the liver. The latter was then placed in this bed prepared between the peritoneum and the musculature of the abdominal wall. The liver was fixed to the musculature of the abdomen by large U stitches of catgut. In this manner an extraperitoneal hepatopexy was performed. Finally the two peritoneal flaps were sutured to the posterior and superior surface of the liver and the laparotomy wound was closed without drainage. The operation was well tolerated. The pulse was 130 for 4 days and the temperature 38.2 degrees, remaining subfebrile for nearly a month. The ascites recurred and a fourteenth puncture yielded 8 liters of fluid with a high bile content, indicating biliary peritonitis. Failure seemed complete. But not so. The fourteenth puncture proved the last. The ascites has not recurred for one year and eight months.

Thus it was possible in this case to relieve the circulation by liberation of the anterior muscular insertions of the diaphragm, thus relaxing the aponeurotic portion of the diaphragm and establishing a direct communication between the abdomen and thoracic organs. Extraperitoneal hepatopexy creates a communication between the blood vessels of the liver and the vessels of the abdomino-thoracic wall, the intercostal branches and internal mammary. 6 figures. Other procedures are mentioned in the discussion.

Surgery of the Abdomen

END RESULTS IN THE SURGICAL TREATMENT OF GASTRIC CARCINOMA

HAROLD H. MORRIS, JR.

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New Orleans M. & S. J., 96:254-62, Dec. 1943

From 1922 to 1931 inclusive, there were 758 patients with gastric carcinoma admitted to the Charity Hospital of New Orleans. Of these, 275 patients were operated on with a mortality of 43 per cent. In the last 200 cases in this series of operated cases, gastrectomy was done in 35 cases with a mortality of 51.4 per cent; palliative procedures in 104 cases with 43.6 per cent mortality; and exploratory operation only in 56 patients with 30.4 per cent mortality. In a series of 1,163 cases of gastric cancer admitted to the Hospital in 1932 to 1940, inclusive, 344 patients were operated on; there were 55 gastrectomies with 31 deaths and 77 palliative operations with 31 deaths. In 1941 to 1942 inclusive, 155 patients with gastric carcinoma were admitted to the hospital, 77 were operated on, with 21 postoperative deaths. Subtotal resection was done in 25 cases with 4 deaths and palliative procedures in 27 cases with 5 deaths; exploratory operation was done in 25 cases with 3 deaths. In the last series of cases the mortality rate for every type of operation for gastric cancer has dropped "significantly" since the earlier series. The status of 20 patients from the earlier series of operated cases is known; 13 died within four years after operation, 2 of these deaths being due to "incidental" causes; 2 are known to have "hopeless" metastases; 5 were living and well when last seen eight months up to eleven years after operation. In the last series, attempted follow-up of the 21 patients who survived the operation of gastric resection has been unsatisfactory. One died seven weeks after operation; 6 more showed evidence of metastases from three to twenty-five months after operation; 12 showed no evidence of metastasis when last seen, but the longest follow-up in these cases was six months. At the Charity Hospital, these figures show that the resectability of gastric cancer has more than

doubled, and the operative mortality has been cut to a third of what it was ten years ago. The author is of the opinion that at present 20 per cent five-year cures may be expected in operable cases; improvement in results must come through earlier diagnosis and earlier operation rather than through improvement in surgical technique.

TOTAL GASTRECTOMY BY THE TRANSTHORACIC APPROACH; REPORT OF SEVEN CASES

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Ann. Surg., 118:816-37, Nov. 1943

The use of the transthoracic route for gastrectomy is of definite advantage in cases of carcinoma involving the cardia and lower esophagus. The chief difficulty in a total gastrectomy by this route lies in securing a satisfactory anastomosis of the esophagus and jejunum without excessive tension. This difficulty, the author found, may be overcome by use of the following procedure. The usual transthoracic approach is used, through the bed of the ninth rib. The entire stomach is removed and the duodenal stump closed. An opening is made in the transverse mesocolon "at a convenient point" with care to avoid injury to the middle colic vessels. The highest jejunal loop is drawn up through the opening in the mesocolon, but often cannot be brought more than 1 to 2 cm. above the level of the diaphragm. In order to release the jejunum, the main artery supplying the proximal jejunal loop is exposed and cut between ligatures close to its point of origin from the superior mesenteric artery; the vein is "treated likewise." This relieves the "pull" of the mesentery so that the jejunum can be brought up far enough to allow the anastomosis to be made without too much tension. The author has employed the Roscoe Graham method of anastomosis. With this method, either the proximal (afferent) arm of the jejunum or the distal (efferent) arm can be used "to wrap around" the line of anastomosis, provided an enteroenterostomy between the two loops is done according to Graham's technique; the afferent must be so short that it will not sag down

below the level of the entero-enterostomy. After completion of the anastomoses, the jejunal loop is "anchored" to the mediastinal pleura, and to the cut edges of the diaphragm which are brought around it. The remainder of the diaphragm is closed, using interrupted silk sutures, and the left phrenic nerve crushed within the thorax to diminish motion of the diaphragm.

The operation of total gastrectomy by the transthoracic route, with esophago-jejunal anastomosis, has been done in 7 cases; in all of these cases this route was chosen because the carcinoma was close to or had invaded the cardia, and in some cases also involved the lower esophagus. Total gastrectomy was done because of "the widespread involvement" of the stomach. Two of the patients died postoperatively; in these 2 cases the technique of freeing the jejunum by relaxing the mesentery had not been employed, but the suture line had separated "in part" in only one of these and this was at least partially the cause of the fatal sepsis. In the other case death was due to "widespread infection"; the esophago-jejunal anastomosis was intact. Five patients recovered promptly without serious postoperative complications; in two of these there had been no difficulty in drawing the jejunal loop up to the level of division of the esophagus; in 3 cases, in which the esophagus had been divided at a higher level, the author's method of freeing the jejunum by dividing the jejunal mesenteric vessels was employed with good results.

THREE SUCCESSFUL CASES OF TOTAL GASTRECTOMY

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Virginia. M. Monthly, 70:549-53, Nov. 1943

The author has performed in all 15 total gastrectomies. The first twelve of these patients died following operation. All except one were for extensive cancer, and that one was for multiple ulcers. Two of the deaths were from pneumonia, one from shock, one from a volvulus of the bowel between the entero-enterostomy and the esophagus, and one from thrombosis of the superior mesen-

teric vessels. The other deaths were from infection, subdiaphragmatic abscess or general peritonitis. In four patients the sepsis resulted from a leak in the suture line; in the others sepsis apparently developed independently of a leak.

During the present year, the author has performed three total gastrectomies, all of which have made satisfactory operative recoveries. Recent contributions to the technic of total gastrectomy are discussed (Morton, Lahey, Allen, Graham).

The technic employed by the present writer in these three successful cases is a combination of different features that have been developed by others and the results of necropsies of his own fatal cases. Local anesthesia was used in one of the three cases, and in the other two ethylene with a small amount of ether. Since the death by volvulus of the jejunal loop, the afferent limb of the loop of the jejunum is united to the stump of the duodenum. This not only makes a three-point fixation of the jejunal loop and prevents volvulus, but offers an easy exit for the duodenal contents. Turner's suggestion of severing the bloodless coronary ligament of the left lobe of the liver and packing off the left lobe toward the right side offers a much better field for the esophageal opening. The gastrocolic omentum is doubly clamped and divided in segments from the duodenum to the spleen. The attachments to the spleen are divided up to the esophageal opening. If the spleen is very close to the stomach or is involved in the malignancy, or if it is injured, it can be readily removed. The attachments along the lesser curvature are also clamped and divided in segments. All of the clamped segments are transfixed and tied with catgut. The duodenum is doubly clamped and divided just distal to the pylorus. If a Jutte or Levine tube has been inserted into the stomach, the gastric contents are aspirated, the duodenal tube is withdrawn, and a soft rubber catheter is placed around the terminal esophagus as a tractor and to prevent reflux of further gastric contents. When the stomach is adherent to the pancreas, this procedure must be varied. The involved portion of the pancreas may be dissected off, leaving it attached to the stomach. This is preferably done with the hot electric cautery. The gastric artery should be clamped and severed before this dissection. The esophagus is mobilized according to the technic of Roscoe Graham, the vagus nerves are

cut, and the esophagus is pulled well down below the diaphragm. About an inch below the suture line an incision is made in the posterior wall of the esophagus and a transverse incision is made in the jejunum. The adjacent margins of the two wounds are united with a continuous suture of cotton.

A rubber tube with a lumen diameter of ¼ of an inch, about 4 inches long with an extra opening near each end, is fastened in the anastomosis by a suture of chromic catgut. The esophagus is then completely severed and the cotton suture is continued anteriorly, and tied to its original end. Another row of continuous sutures is placed anteriorly between the jejunum and the esophagus, drawing up as much of the efferent loop as possible, and then a third row of interrupted mattress sutures of fine chromic catgut is placed, bringing the jejunum up still farther. The ends of these last sutures are left long and a strip of omentum is carried around the anastomosis and the long ends of these mattress sutures are passed through the omentum. If omentum cannot be obtained, the anterior surface of the jejunum is sutured to the diaphragm just in front of the esophagus. The afferent or right loop of the jejunum is united to the stump of the duodenum by an end-to-side method of anastomosis. An entero-enterostomy is made between the two limbs of the jejunal loop as they pass over the transverse colon. A mushroom catheter is inserted in the efferent loop and brought out through a stab wound to the left of the abdominal incision. The bowel around this catheter is sutured to the parietal peritoneum. Some sulfanilamide and sulfathiazole are placed in the peritoneal cavity. The abdominal wound is closed with interrupted sutures of malleable stainless steel wire through all of the abdominal wall except the skin and subcutaneous fat. The skin is closed with cotton suture. The patient receives a blood transfusion, and intravenous Ringer's solution is given almost continuously for about two days unless the blood pressure tends to be elevated or there is pulmonary congestion. The three successfully operated cases are described briefly. 4 figures.

LYMPHOSARCOMA OF THE STOMACH

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Gastroenterology, 1:1022-39, Nov. 1943

In 250 cases of neoplasm of the stomach admitted to the Surgical Service of Mount Sinai Hospital from July 1, 1937 to June 30, 1943, 8 were found to be lymphosarcoma, a higher incidence (3.2 per cent) than is usually reported. The tumor was a typical small round cell lymphosarcoma in 7 of these cases and reticulum cell sarcoma in one case. The most characteristic symptom in these cases was upper abdominal pain not relieved by food or alkali; belching, nausea and vomiting were common; hematemesis was unusual but melena occurred frequently; in one case there was dysphagia and other symptoms simulating a benign cardiospasm. There was a palpable mass in 3 cases. Roentgenologically, exaggeration of the mucosal folds with formation of giant rugae suggests the diagnosis of lymphosarcoma and indicates further diagnostic study. In a young patient a large ulcer crater with "a relatively short history" also suggests the possibility of lymphosarcoma. Gastroscopy is of value in diagnosis especially in the diffuse infiltrating type of lymphosarcoma. In cases where the roentgenologic and gastroscopic findings indicate a malignant growth near the cardia, biopsy specimens may be obtained through an open esophagoscope. In lymphosarcoma surgical exploration may show a normal-appearing stomach, but if the x-ray or gastroscopic studies have shown evidence of malignancy, a gastrotomy should be done to obtain a section for histological examination. In 2 of the cases reported, the entire stomach was found to be involved by an ulcerating polypoid tumor; a total gastrectomy was done in both cases, but both patients died of peritonitis. In these cases the true nature of the growth had not been determined preoperatively; a full course of radiotherapy should have been given before attempting operation. In 3 cases gastric resection was done with subsequent radiation therapy; 2 of these patients have died, one seven months and one eight months after operation; the third is being given radiotherapy. Three cases in which diagnosis was established by biopsy were treated with radiotherapy alone; one of these patients

is living and well three years after exploratory laparotomy and gastrotomy; 2 patients have died, one year after onset of symptoms. The poor results in this small series of cases of lymphosarcoma of the stomach are similar to those reported for larger series.

THE SURGICAL TREATMENT OF GASTROJEJUNAL ULCER

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Texas State J. Med., 39:381-84, Nov. 1943

Following a discussion of the etiology, pathology and diagnosis of gastrojejunal ulcer, the author emphasizes the very great significance of prevention in these cases, and that routine gastroenterostomy for duodenal ulcer is an unsound procedure, except in specially selected cases. The author prefers the Hofmeister type of anastomosis which connects the unclosed cut end of the remaining stomach to the most proximal loop of the jejunum. Closure of the duodenal stump is the only difficult technical part of this procedure. The duodenum must be mobilized so that the free margins can be inverted. This should be reinforced with a row of silk sutures and covered with omentum. No entero-anastomosis should be made between the jejunum and duodenum. This procedure should yield a mortality rate of less than 5 per cent. Patients selected for resection should be those who have not responded to adequate medical management because of age, sex, race, ulcer diathesis, uncontrolled high acidity, or whose nervous, social or economic status justifies radical surgical intervention.

If a gastrojejunal ulcer has formed, medical management may be tried but will usually be disappointing. However, with medical treatment the patient may improve so that surgery will be a safer procedure. The object of surgical intervention is not only for immediate relief of the patient's symptoms, but also for the ultimate prevention of recurrence of ulcer formation. The procedure of choice will depend upon the general condition of the patient. In cases of marked obstruction with starvation, and alkalosis, a minor procedure necessarily will be in order. A simple jejunostomy will

put the stomach at rest and be an adjunct in feeding the patient. It may be used as a preliminary step in preference to an enteroanastomosis between the duodenum and jejunum. A disconnection of the gastro-enterostomy with closure of the jejunum and stomach should serve only as a preliminary step to further radical resection. Fluid balance must be adequate and anemia must be combated with blood transfusion before operation. The stomach should be kept empty and the patient as comfortable as possible. Local infiltration anesthesia can be used for more minor procedures, but for more radical procedures the author prefers intertracheal inhalation of gas and ether. Bronchial aspiration is indicated immediately in case of suspected atelectasis.

The operation of disconnecting the former gastro-enterostomy with subsequent subtotal gastrectomy with pylorectomy should be planned in either one or two stages. Details of technic are discussed.

The salient points to be remembered in postoperative management should consist of rest, adequate fluid balance, and early feedings with decompression of the upper abdominal tract. With this in mind the author has routinely carried out jejuno-gastrostomy, the advantages of which are enumerated. The author has employed this principle of decompressing the gastro-intestinal tract in over 200 cases, without subsequent peritonitis, fistula or obstruction.

ACUTE GASTRODUODENAL PERFORATIONS: REVIEW OF METROPOLITAN HOSPITAL SERIES, 1930-1941

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Am. J. Surg., 62:39-49, Oct. 1943

Of 89 cases of perforated gastric and duodenal ulcer admitted to the Metropolitan Hospital from 1930 to 1941, inclusive, 87 cases were operated on. The ulcer was pyloric in 10 cases and duodenal in 25 cases; of the gastric ulcers, the majority were anterior prepyloric. The characteristic symptoms of perforated gas-

troduodenal ulcer are a sudden onset of severe abdominal pain, board-like rigidity of the abdomen, and a "silent" abdomen on auscultation; a previous history of typical ulcer symptoms can be obtained in about 75 per cent of cases. The presence of subdiaphragmatic air in the roentgenogram is pathognomonic of a ruptured viscus. If this sign is not present, administration of 30 to 50 cc. of a dilute methylene blue solution by mouth or through a Levine tube and its recovery by peritoneal aspiration half an hour later definitely establishes a diagnosis of perforation. If the diagnosis of perforation is not confirmed by either method, determination of serum amylase should be done to exclude acute pancreatitis. In the series of cases reported, a correct preoperative diagnosis was made in 89.7 per cent; in the last two years of this period, diagnosis was missed in only one case, and in this case the dye test was not made. The most common erroneous diagnosis was acute appendicitis. On the basis of their experience the authors conclude that simple plication of the perforation, with or without reinforcement with omentum, is the method of choice, and the wound should be closed without drainage. In the series of cases reported, the operative mortality was 25.2 per cent; in the cases in which simple plication was done without drainage, the mortality was 22.4 per cent, but in cases in which the same operation was done with drainage, the mortality was 31.2 per cent. As a rule radical operation is not indicated in perforated gastroduodenal ulcer; gastrectomy was not done in any of the cases in this series. However, the authors are of the opinion that if operation is done within six hours after perforation and if the patient is "an exceptionally good operative risk" and the surgeon is experienced in gastric resection, primary subtotal gastrectomy "should be considered." In the series reported, intraperitoneal implantation of a sulfonamide was employed in only 5 cases with 3 deaths. On the basis of their recent experience, the authors advocate the local implantation of 8 gm. sulfanilamide and 4 gm. sulfathiazole in all cases operated on more than six hours after perforation. Intravenous fluids should be given preoperatively and postoperatively, and gastric suction by the Wangenstein method should be employed before, during and after the operation. Oxygen should be given, preferably by means of a mask, in the "critical postoperative period." The fluids

administered postoperatively, including whole blood, plasma, glucose and saline, should correct hypoproteinemia and, if necessary, vitamin deficiencies.

A STUDY OF THE HEALING OF ABDOMINAL OPERATIVE WOUNDS FOLLOWING CLOSURE OF PERFORATED ULCERS OF THE STOMACH AND DUODENUM

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Surgery, 14:526-30, Oct. 1943

From January 1, 1912 to January 1, 1936, acute perforations of gastric and duodenal ulcers were treated at the Episcopal Hospital of Philadelphia by evacuation of "readily available fluid" from the peritoneal cavity and closure of the perforation. In the first twenty years of this period, gastroenterostomy was done in 36 of 50 cases in the series studied, but in the last four years in only one of 40 cases. Pelvic peritoneal drainage was established by a stab wound, but the operative wound was closed without drainage. The 90 patients studied all recovered from the operation and were followed up for a sufficient time to determine whether any infection of the wound developed. There was no evidence of infection in 67, or 74.4 per cent; infection was classified as serious in only 4 cases, and in 3 of these dehiscence of the wound occurred. Recent studies of wound healing suggest that dehiscence of the wound in these cases was probably due to nutritional disturbances rather than to infection, but the data available are not sufficient to prove this conclusion. The time of operation in relation to the duration of the perforation did not appear to affect wound healing. With operation under six hours, 79 per cent healed without infection of the wound, but with operation in twelve to eighteen hours, 83 per cent healed without infection. Some correlation was found between wound healing and the amount and character of the peritoneal fluid. In 6 cases with no fluid, the wounds all healed by primary intention; in 28 cases with small amounts of fluid, 85 per cent healed without any wound infection; in 36 cases with moderate amounts of fluid; 69.44 per cent healed without infection, in

20 cases with large amounts of fluid, 65 per cent healed without infection. The character as well as the amount of fluid appeared to be of importance. In 51 cases in which the peritoneal fluid was clear, 82.3 per cent of the wounds healed without infection; in 19 cases with gastric contents in the fluid, 63.15 per cent healed without infection; in 14 cases with "frank pus," 50 per cent healed without infection. In these cases, the operative wounds were not "washed out" before closing and no antiseptics were used and these operations were done "before the sulfonamide era." As the soft tissues are less resistant to infection than the peritoneum, and the majority of these wounds healed without infection, the author considers it reasonable to conclude that peritoneal drainage was rarely, if ever, needed in this series of cases. On this basis, the author concludes that in acute perforated gastric and duodenal ulcer, peritoneal drainage is not indicated if the perforation can be "satisfactorily closed" and no walled-off pus is present. With the addition of the local use of sulfonamides, this conclusion "seems justified."

CHOLECYSTO-ENTEROSTOMY, CHOLEDOCHO-ENTEROSTOMY AND ENTERO-ENTEROSTOMY BY MEANS OF RUBBER BANDS: THE USE OF RUBBER BANDS IN THE MIKULICZ OPERATION

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Ann. Surg., 118:558-74, Oct. 1943

In experiments on dogs, intestinal anastomosis was done, using a rubber band; in 2 animals, there was slight necrosis of the tissue, and in one a small fistulous opening in twenty-four hours, the fistula becoming larger in forty-eight hours. In 3 animals the rubber band was surrounded with catgut sutures, in 6 the rubber band alone was used; there was no evidence of leakage or of peritonitis in any case; nor were there any signs of intestinal obstruction. In clinical work the rubber band has been surrounded by a continuous suture of chromic catgut, as this adds little to the difficulty or

time of the operation and seems to be "safer." The ordinary stationer's No. 32 rubber band is employed; it is cut obliquely, and threaded into a large curved needle without a cutting point, formerly called a "catgut needle." A continuous suture of fine chromic catgut is first used to unite the two segments of bowel or the bowel and gallbladder. The rubber band and needle are dipped into iodine solution just before use. "A long, deep bite" is taken in one viscus, and the end of the band clamped with a hemostat, and the band drawn through under tension; and carried through the opposing viscus, also taking a considerable bite with the needle; when only a single rubber band was used, the band was then tied. But the authors now employ a triple band technique, and the first band when carried through the viscera is not tied immediately. A second rubber band is passed through "the bite" in the bowel on one side, and third band through the bite in the bowel or other viscus on the opposite side. An incision is then made in through the peritoneum, and some of the muscular coat of the viscus "within the grasp" of the last two bands and each of these bands is tied down. Then the first band is tied several times. The suturing (catgut) around the bands is completed. The "rubber band operation" has been used 19 times in 18 patients, the single band technique was used in 9 operations, the triple band technique in 10 cases (all the recent cases). The indications for the use of this technique have been: obstruction of the terminal portion of the common duct (either cholecysto- or choledocho-enterostomy); intestinal obstruction (entero-enterostomy) as an adjunct to anterior gastroenterestomy or total gastrectomy; and the Mikulicz operation. If this method is used with the Mikulicz operation, it makes "a subsequent formal operation" for closing the bowel unnecessary.

INTESTINAL OBSTRUCTION

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Pennsylvania M. J., 47:221-24, Dec. 1943

The author emphasizes the value of continued pain as an indication for abdominal surgery. When fecal vomiting occurs, disso-

lution has already set in, and death is approaching. He warns against the masking of this important symptom of pain by giving hypodermics. The symptom of unrelenting pain continuing for hours should alone suffice for diagnosis of an acute surgical abdominal condition. Failure to evaluate signs such as peritoneal facies, scars of previous operations, dry, chip-like tongue and distended abdomen may allow the safe time to operate to slip by forever. Little logical thought is given to whether the obstruction be high or low, or to the condition of the circulation of the affected part, since introduction of the Wangensteen suction-tube has rendered treatment simple and easy. With all its advantages, the author sometimes thinks that more lives might have been saved if this treatment were unknown. Until observers have been trained who have a more complete comprehension of the physiology and pathology involved, many lives will be sacrificed because of failure to use the aseptic scalpel. There are definite indications for suction, but it cannot be too strongly emphasized that, with signs of interference of the circulation of the affected part, no time should be wasted; surgery should be done at once. The tragedies occur in the use of the suction-tube in these cases or in its continued employment for too long a time, until gangrene has developed.

Discussion by George W. Hawk, of Sayre; George P. Muller, of Philadelphia; and Ford M. Summerville, of Oil City.

CERTAIN CONSIDERATIONS IN THE MANAGEMENT OF SMALL INTESTINAL OBSTRUCTION

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J. Missouri M. A., 40:339-41, Nov. 1943

The types of obstruction of the small intestines have a definite relationship to future complications, to the nature of the operation, to the necessity for immediate surgery and to the probability of relief by medical measures. The usual types of small intestinal obstruction are simple, angulated, strangulated or loop, inflammatory, intussusception, and those that are intrinsic. Early complete

simple obstruction requires immediate operation for its release and this is usually simple and attended by a speedy recovery. Advanced obstruction, in which the intestines are extensively dilated in a transverse position and in which there has been much fluid loss, through vomiting, requires rehabilitation by fluids, saline solutions and intestinal intubation prior to operation. This type of dilatation is an indication for the use of the Miller-Abbott tube. Incomplete obstruction may be relieved by fluids and the Miller-Abbott tube. Angulated obstruction from an adherent constriction requires the same program of treatment.

External strangulated obstruction presents itself as a serious emergency requiring immediate reduction or surgical operation. The author advises only surgical reduction and repair in these cases. Even in the presence of proximal bowel distention of an advanced degree, immediate operation is indicated.

Obstruction occurring following surgery for an acute inflammatory process must be at least considered as an inflammatory obstruction and appropriate conservative treatment must be instituted. Many of these obstructions will correct themselves after the protracted use of the Miller-Abbott tube and adequate rehabilitation by fluids and saline. As the inflammatory process subsides, the obstruction will be released. In intussusception of the small bowel into the right colon in small children, an attempt should be made to reduce the intussusception by enemas. These are sometimes successful in the early stages of the disorder before edema and swelling have fixed the bowel at the point of the cecum and narrowed it to a point at which reduction cannot be accomplished. The enema must be given under fluoroscopic control with a thin opaque media. Only by this method can one observe under direct vision the success of reduction and the assurance that complete reduction has occurred. Forceful attempts at reduction by enemas should not be made, and in no form should they be prolonged if success is not readily obtained. The condition is usually and primarily one requiring surgery. Surgical attempts should be gentle and reduction accomplished by milking or massaging the intussuscepted bowel from the distal toward the proximal end. No attempt to extract the bowel by traction should be made. A gangrenous bowel or ineffective reduction is usually

fatal as resection is not tolerated in infants or young children, hence conservative measures should not be long employed.

New growths causing obstruction require resection and stone obstruction may be removed by local excision and closure or by resection. Usually edema, hypertrophy of the bowel, and induration at the site of stone obstruction make resection and anastomosis preferable. Transfusion is of greatest value in strangulated obstruction in which the blood loss has been great. In strangulated and loop obstructions resection depends upon the viability of the bowel. 2 references.

OBSTRUCTIVE LESIONS OF THE COLON, DIAGNOSIS AND SURGICAL MANAGEMENT

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Northwest Med., 42:311-15, Nov. 1943

The author directs attention to the increased incidence of cancer of the colon and discusses early symptoms that should arouse suspicion of malignancy. Differential diagnosis must be made from hyperplastic tuberculosis of the colon, actinomycosis, appendiceal abscess, retrocecal appendiceal masses and nonspecific granulomata of the cecum. Multiple polyposis of the colon may require a prophylactic colectomy in the presence of evidence of infiltrative pathology at the base of one of the polyps.

There is no curative medical management for obstructing infiltrating lesions of the colon. The success of any operation on the colon and rectum depends to a great extent upon effective preoperative treatment and postoperative care. One week of preoperative rest has been found essential for evaluation of heart, blood pressure and kidney function. The patient should be limited to non-residue foods, rich in carbohydrates in order to build up glycogen reserve. Glucose in saline intravenously twenty-four hours preoperatively insures proper fluid balance. Blood transfusion is indicated if the hemoglobin and erythrocyte count are low. All traces of barium should be removed by cleansing enema. Mild laxatives may be used up to 48 hours before operation and

thereafter only high caloric clear liquids and stick candy should be used in the dietary. Paregoric, dr. 1-2, is given every four hours the day preceding operation to splint the bowel for surgery.

The ideal operative treatment for obstructive lesions of the colon and rectum consists of early removal of all regional pathologic tissue and avoidance of all unnecessary mutilation. The type of procedure must be individualized. The surgical methods in use include colostomy, local or partial excision, vaginoperineal excision, perineal excision, sacral excision, abdominoperineal resection, abdominal sacral resection, abdominal resection and obstructive resection. In general perineal excision is applicable to growths involving the lower rectum and anus; for growths in the lower and midsigmoid, rectosigmoid and upper rectal areas of the colon, abdominoperineal resection in stages as by the combined method seems preferable. Abdominal resection may be employed for carcinomata in the sigmoid, where mobilization of the lesion and bowel segment is possible. 10 references. 1 figure.

CONGENITAL MEGACOLON; FAVORABLE END RESULTS OF TREATMENT BY RESECTION

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Gastroenterology, 1:922-37, Oct. 1943

In 29 cases of megacolon in which subtotal colectomy was done, 24 of the patients were males; 16 were from 2 to 20 years of age, 2 were less than 2 years of age, and 11 were over 20 years of age. In all but 2 of these patients obstipation of varying severity had been present since birth; in 2 cases symptoms had been present for several years. There were 7 deaths following the operation, but in one of these cases death did not occur until after an operation to close the colonic stoma; in the interval of one year, the patient's condition had been definitely improved. In 3 of the 7 fatal cases, the patient was under 3 years of age. The mortality rate was 50 per cent in 6 cases operated between 1908 and 1909, and 17.4 per cent in those operated from 1920 to 1941. In the earlier period,

the surgical methods were different; the intestine was not emptied before operation, chemotherapy was not available, and methods of preoperative and postoperative care had not been developed to " the present high stage of efficiency." Twenty of the 22 surviving patients have been followed up for varying periods of time since operation. In the other 2 cases the patients were in good condition at the time of their discharge from the hospital. In 2 of the 20 cases, the operation had been done only recently when the follow-up study was made; the immediate postoperative results were "excellent" in these cases. In 2 other cases, follow-up data were obtained only one month and four months respectively after operation, both of these patients were in good health and had gained weight at that time. Eliminating these 4 cases, 16 patients have been followed up for an average period of ten years. In 13 of these cases, the results are classified as excellent, i.e., nutritional state good and daily bowel movements without the use of laxatives; in 3 cases the patients either had a minute persistent fecal fistula or had to take an enema or a laxative at times. In 2 of the cases in which bowel movements were normal without laxatives roentgenological examination showed some dilatation of the remaining portion of the colon or of the ileum; one of the patients who had to use an enema every three days also showed dilatation of the remaining colon and of the ileum on one examination, which subsequently disappeared. Two of the patients, in both of whom colectomy had been done in two stages, could not tolerate drastic cathartics. On the basis of their results in these cases, the authors conclude that: Subtotal colectomy is the treatment of choice in cases of "segmental, congenital idiopathic megacolon," in cases in which medical treatment or sympathectomy is ineffective, and in cases in the megacolon if due to chronic mechanical obstruction. Subtotal colectomy is also the operation of choice in cases of severe megacolon, in cases that do not respond to spinal anesthesia, and in males. Operation should not be done in infancy and early childhood (under 3 years of age) unless some emergency renders it necessary; in such cases special attention should be given to pre- and post-operative care.

PREOPERATIVE TREATMENT IN INTRA-ABDOMINAL SURGERY OF THE COLON AND RECTUM *(O tratamento pré-operatório na cirugia intra-abdominal do colon e reto)*

JORGE DE CASTRO BARBOSA

Rio de Janeiro

Rev. brasil de cir., 12:575-90, Sept. 1943

In the absence of associated lesions, the time of hospitalization previous to operation should be about 72 hours, for less extensive interventions up to five or even ten days in more extensive operations. This affords time for preparation of the gastro-intestinal tract and for making the various required laboratory tests and examinations, including tests of renal function, determination of blood urea, blood counts, hemoglobin determination, WaR tests, and to determine the blood group of the patient and of prospective donors. A complete urinalysis is indicated as well as electrocardiographic records, roentgen examination of the chest, etc.

The most important problem in preparation of a patient with a lesion of the colon for operation is obstruction. Most cases of cacer of the colon present during some stage of their course one or several attacks of chronic or subacute obstruction. The minority of cases present acute obstruction. Any malignant lesion of the intestine tends to become annular with resulting partial or complete obstruction of the lumen. The same is true of diverticula and benign tumors, volvulus, invaginations, etc. For diagnosis of partial or complete obstruction, an opaque enema should be given followed by roentgen examination. Barium by oral ingestion is contraindicated.

As the intestinal occlusion is chronic or at most subacute in the majority, there is time for decompression in 90 per cent of cases by medical measures. The operative mortality is confined to cases in which the intestine has collapsed. The transcolic extravasation of virulent bacteria is the most common cause of fatal peritonitis. Mere manipulation of a distended loop, even though there is no laceration, may lead to peritonitis by this mechanism. The medical measures employed for decompression include purgation, intestinal irrigation and a low residue diet. Purgation must be prescribed only in carefully selected cases. It is, of course, contraindi-

cated in cases of complete obstruction. At the Mayo Clinic, Fleet's solution, a solution of phosphate and biphosphate of sodium, is administered in doses of 12 to 24 cc. varying with the size and strength of the patient and the degree of obstruction. This is administered twice on the first day, once in the morning and once in the evening. On the second day it is administered in the morning. This purgation should not be kept up for more than 48 hours as it may irritate the bowel and dehydrate the patient. In cases in which a colostomy is planned as a preliminary stage of intervention such purgation is not used.

Another method of emptying the bowel is by intestinal irrigations with normal saline (from 39.5 to 40.5° C.). This also diminishes infection and soothes the inflammatory process. Such irrigations must, however, be administered by trained assistants. The container must not be raised to too high a level and the injection should be made with the patient in lateral decubitus. Two irrigations may be given on the first day, one in the morning and one at night. On the second day only one irrigation is given, and that in the morning.

For each irrigation one liter of saline solution is injected at least 3 times and at most 5 times. By this time the returning fluid should be clear. In rare cases and when the constriction is rectal, an attempt may be made to pass a sound with rectoscopic aid. This may lead to decompression when other methods fail. If the saline irrigations do not suffice, a magnesium sulfate solution or water with glycerin added may be tried. Finally, if none of these suffice, a solution of oxygenated water (25 to 50 per cent) may prove useful. On the second day after the final irrigation, the excess fluid in the colon is aspirated at 10 A.M., 2 P.M. and 6 P.M. At the same time the patient is given 8 cc. of tincture of camphorated opium to inhibit intestinal peristalsis. On the third day aspiration is repeated and the rectum palpated to verify evacuation. In cases with preliminary colostomy, the irrigations are done through the rectum and through the colostomy opening, needless to say with utmost gentleness. In cases of acute obstruction, the Miller-Abbott tube is indicated. The mode of application is described as well as measures employed to combat dehydration, malnutrition, and anemia. The diet must be non-residual. In simple

cases the preoperative diet for 3 to 4 days may consist of carbohydrates. Sugar is important to support the liver. A large quantity of water or fluids should be ingested. In some cases additional vitamin therapy is needed. It may be administered orally, or as at the Mayo Clinic parenterally, including dextrose, sodium chloride, thiamin chloride, riboflavin, nicotinamide and vitamin K.

Intraperitoneal vaccine therapy (Mayo Clinic) has reduced the mortality rate of these operations. One cc. of vaccine diluted with 9 cc. of physiologic serum is injected at a site directly opposite the lesion and at a distance of 5 cm. from the umbilical cicatrix, 48 hours before operation. Preoperative intestinal asepsis with succinylsulfathiazole, 0.25 gm. per kilo of bodyweight, administered orally in six divided doses, with intervals of 4 hours between each dose. No food is given the patient after the evening before operation. 0.10 gm. of nembutal is administered on the evening before the operation and on the morning of the operation. Before being transported to the operating room, the patient is given 0.01 gm. of morphine sulfate and 0.0005 gm. of atropine sulfate hypodermically. Every patient is required to empty his bladder before being taken to the operating room. The rectum is examined to insure that it is empty. If not, the surgeon, and the surgeon alone, determines whether the planned operation shall take place. 39 references.

CANCER OF THE LEFT COLON AND RECTUM

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South. M. J., 36:685-91, Oct. 1943

In 87 cases of malignant growth of the rectum and rectosigmoid, various types of operations were employed; in most of these cases (46) a one-stage abdominoperineal operation with abdominal colostomy was done; in 16 cases a one-stage abdominoperineal resection was done, "sliding" the colon either to an anatomically intact anus, or to a perineal outlet or perineal colostomy; two-stage adomino-parietal resections were done in 9 cases, and two-stage loop colostomies followed by posterior resection in 4 cases. One

of the patients in this series who had a one-stage abdomino-perineal operation, "sliding" sigmoid to the anatomically intact anus, is living and well four years after operation; while the anus is anatomically normal, it functions poorly. In 19 cases of malignant growth of the left colon above the rectosigmoid, the modified Mikulicz exteriorization operation was used in most cases; in 2 early cases resection and primary anastomosis was done; in the Mikulicz operation a temporary colostomy is formed that is subsequently closed. In cancer of the rectum and rectosigmoid, the author has found that the one-stage operations with perineal outlet show a definitely high postoperative morbidity and somewhat higher mortality than the one-stage operation with abdominal colostomy; this "mitigates against" the routine use of the perineal outlet, particularly as even an anatomically normal anus does not always function normally. The author has found that large malignant growths of the rectum, although apparently fixed, may be removed without great difficulty. If cancer of the ampulla of the rectum is inoperable, it rarely causes signs of obstruction, so that a colostomy is not indicated as a palliative operation; with inoperable growths in other areas, causing definite symptoms of obstruction, a "palliative" colostomy may be done. In patients over 70 years of age, a radical resection is not indicated in cases in which the diagnosis of malignancy is "questionable," as the mortality from the radical operation is definitely increased at this age. This is attributed to an "age condition" of the tissues and rigidity of the blood vessels which interfere with healing.

ONE-STAGE PERINEO-ABDOMINAL OPERATION FOR CANCER OF THE RECTUM

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Surgery, 14:691-701, Nov. 1943

The Miles abdomino-perineal operation is the radical operation for rectal cancer most frequently employed; since 1930, the author has used "the reverse sequence" for the radical removal of rectal

cancer, i.e., the perineo-abdominal sequence. No long preoperative preparation is employed; a purgative is given forty-eight hours before operation and an enema the night before operation. A Levin tube is passed into the stomach and gastric suction begun before operation; this is continued for three to four days after operation. The patient is placed in the extreme lithotomy position for the first stage of the operation. A yard strip of dry gauze is placed in the rectum, which aids in identifying the rectum and thus facilitates dissection, and which also absorbs any fluid in the rectum. The anus is closed with a double row of purse-string sutures. The rectum is dissected from its attachments, hemostasis being established as the operation proceeds. In men, the rectum is separated from the urethra and prostate in front; in women, the author has found it advantageous to remove the posterior wall of the vagina with the rectum. A sterile glove is placed over the anal and rectal portion thus freed and is tied securely, "high up," with a strong ligature around the bowel; this portion of the bowel thus covered with the glove is pushed into the peritoneal cavity. The peritoneum is sutured with 0 chromic catgut doubled on a round needle for a short distance, beginning at the bladder, then the needle and suture "securely wrapped" around a piece of gauze are pushed into the abdominal cavity. The perineal space left by the removal of the rectum is filled with a pack of iodoform gauze covered with rubber tissue or cellophane, and the perineal wound is closed and dressed, with a drain in the center. The patient is then placed in the Trendelenberg position and prepared for laparotomy. The gowns and gloves of the operating team are changed. A midline incision is used. The rectum covered with the glove is brought out of the abdomen, and the liberation of the rectum and sigmoid completed "well on to the sigmoid flexure"; the suturing of the peritoneum begun in the first stage of the operation is completed; in women, it has been found advisable to suture the uterus back over the peritoneal suture line. A permanent colostomy is established either on the left side or in the midline; the author prefers the latter method. The abdominal incision is then closed around the colon as prepared for colostomy and the bowel "burned across" with the electric cautery between two clamps. When gastric suction is used postoperatively to keep the intestines

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free from gas, the clamp may be kept on the colon for thirty-six to forty-eight hours. The author has found that this operation provides as radical a resection as the Miles operation, but it is easier to perform and takes less time; patients are in better condition postoperatively. As the bowel is not opened until the operation is completed, there is no danger of soiling "with ordinary care" in the dissection. Ileus and abdominal distention are prevented by routine postoperative gastric suction. This operation has been done on 46 patients with 2 postoperative deaths; both of these deaths occurred early in the series; there has been no postoperative death in the last 39 operations by this method.

ONE STAGE COMBINED ABDOMINOPERINEAL RESECTION FOR CARCINOMA OF THE RECTUM: RESULTS OF THREE YEAR FOLLOW-UP SURVEY IN NINETY CASES

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Proc. Staff Meetings Mayo Clinic, 18:438-43, Nov. 17, 1943

The authors present the results of a follow-up study of ninety consecutive cases in which the one stage combined abdominoperineal resection was performed for carcinoma of the rectum. The cases were followed up for three years. Many of those traced are known to be living five years or more after operation. The series comprised 52 males and 38 females, the majority being in the fifth and sixth decades of life. Nine were less than forty years of age. Only one was more than seventy. In the past two years 6 patients who were seventy years or over withstood this procedure without untoward reaction. Physiologic rather than chronologic age is the determining factor. The procedure was done for curative purposes in 79 cases and for palliative purposes in 11 cases. Almost half of the latter group survived three years or more. Sixty-one of the entire group were known to have survived three years or more; 29 had died. Metastatic carcinoma was responsible for the deaths of 25. Cerebral vascular accident or heart disease was the cause of death in the other 4 patients.

The presence or absence of metastasis to the regional lymph nodes has an important bearing on prognosis; 39 of 45 patients without such metastasis survived three years, whereas only 17 of 34 patients with such metastases survived. Accurate prognosis can best be attained by using both the Duke and Broder method of grading malignant tumors. The majority of lesions were found to be of low grade. Even a patient who has rectal malignancy of high grade removed now has a chance at survival and clinical cure. The earlier these patients are seen and examined and sent to operation, the better will be the prognosis. Among the more important postoperative measures, the most essential, in the authors' estimation, are the use of 100 per cent oxygen and a routine transfusion of fresh blood. 4 tables.

THE NEW TYPE OF DRAINAGE IN GALLBLADDER FIELDS

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West. J. Surg., 51:440-49, Nov. 1943

In 1934, the author published a preliminary description of a method of suction drainage of the peritoneal cavity which he had then used for several years. The technique of this method has been constantly improved until now a double-barrel tube is employed (Chaffin Double-Barrel Tube) with perforations in each limb, and an electric unit to produce suction. The tube provides for the constant flow of air or fluid through one limb, while suction is applied to the other limb; it also provides for "drip" irrigation with saline or Dakin's solution (Dakin's solution being used in all "foul" cavities). With this tube there is no suction on the tissues, and only fluid contents are removed. The unit used for suction is noiseless; operates two collection bottles at once, so that it can be used with a Levin stomach tube and the abdominal drainage tube simultaneously; and has a controlled pressure of 30 inches of water (20 mm. hg.). With this apparatus, early operation is done in "practically all types" of gallbladder disease. In very acute infec-

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tions of the gallbladder, it is not necessary to do a cholecystectomy if adequate drainage is maintained by the suction apparatus; a cholecystectomy may be done later. If the gallbladder has become gangrenous and broken down or perforated, peritonitis is not a serious danger, as all secretions (including bile) are removed by the suction apparatus. Gravitating and metastatic abscesses have not formed in such cases in the author's experience. The use of this apparatus has shown that in practically all cholecystectomies there is a "measurable amount" of bile drainage. Much of the ileus, gas, and abdominal discomfort occurring after gallbladder operations, the author believes, is due to bile peritonitis; with the use of suction drainage these symptoms do not occur postoperatively. If an associated drainage is "adequately and safely" maintained by the suction tubes in the lesser cavity no enzymes drain into the peritoneal cavity is necessary. All tubes exit through stab wounds when possible (in nearly 100 per cent of cases) and the incisions are not contaminated with either bile or infected material. With the use of suction drainage, the author states that deaths from peritonitis can be reduced by 75 per cent.

CASE REPORT AND REVIEW OF CHOLECYSTELECTROCOAGULECTOMY (THOREK)

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Journal-Lancet, 63:328-29, Oct. 1943

The author has used Thorek's method of cholecystelectrocoagulectomy in approximately 12 cases of gallbladder disease of severe type without a fatality; in some of these cases there was gross infection of the gallbladder. In this operation the gallbladder bile ducts and adjacent viscera are exposed; the operative field is isolated with warm moist sponges. The cystic duct and cystic artery are ligated and cut between ligatures. If fluid is found in the gallbladder it is aspirated; the gallbladder is opened widely and any stones removed; then the redundant convex portion of the gallbladder is resected and the remaining portion of the gallbladder is coagulated electrically, destroying all the mucosa; the lateral cut

edges are brought together by a running catgut suture. The falciform ligament is detached from the abdominal wall and folded laterally across the remnant of the gallbladder. While Thorek closes the wound without drainage, the author has used two split tube drains. In the case reported there was an acute empyema of the gallbladder with cholelithiasis; the gallbladder contained purulent fluid, cultures showed gram-positive cocci, gram-positive rods and gram-negative rods. After the Thorek operation, 7 gm. of sulfanilamide were placed in the peritoneal cavity, and the wound closed with two split tube drains. The patient made an uncomplicated recovery.

PERFORATION OF THE GALLBLADDER; A STUDY OF TWENTY-FIVE CONSECUTIVE CASES

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Surg., Gynec. & Obst., 77:661-68, Dec. 1943

In a series of 2,750 gallbladder operations of all types at the Henry Ford Hospital from September 1921 to April 1943, perforation of the gallbladder occurred in 25 instances. In most of these cases (16) a localized pericholecystic abscess was present, in 6 cases an acute free perforation, and in 3, perforation into a viscus. The correct diagnosis of perforated gallbladder was rarely made preoperatively; it was considered as a possibility in only 12 per cent of the cases. Cholecystectomy was done in 17 cases; in one case the perforation was found at autopsy. The mortality in these 25 cases was 24 per cent. Most of these cases of perforation occurred in women past fifty years of age, with a history of chronic cholecystitis with repeated attacks, but a short acute attack prior to the perforation. Pain in the right upper quadrant with localized tenderness and nausea, with vomiting were the chief symptoms in these cases; in 24 per cent of the cases there was a localized mass; the white cell count indicated infection or inflammation. While the symptoms indicated an acute cholecystitis, there was no definite evidence in most cases of impending or actual perforation. These findings indicate that careful observation is indicated in cases of

acute cholecystitis, especially in patients over fifty years of age. In a study of the 6 fatal cases, it was found that 2 might have recovered if operation had been done earlier in the acute attack, but this does not argue for routine early operation in acute cholecystitis, in the authors' opinion. The history indicates, however, that the life of 5 of these 6 patients would have been saved if an "interval" cholecystectomy had been done after a previous acute attack.

PERITONEOSCOPY; AS AN AID IN THE DIAGNOSIS OF CARCINOMA OF THE GALLBLADDER

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Bull. New York M. Coll., Flower & Fifth Ave. Hosp., 6:107-12, Oct. 1943

Carcinoma of the gallbladder has usually been found either at autopsy or during an exploratory laparotomy. There are few, if any, signs or symptoms that indicate the correct diagnosis at a time when the growth might be operable. The development of peritoneoscopy suggests the possibility of earlier diagnosis of carcinoma of the gallbladder, as this organ can be visualized by the peritoneoscope. Only a small opening in the abdomen made under local anesthesia is necessary for peritoneoscopy; the procedure is not dangerous or difficult and does not cause the patient pain or discomfort, but it must be done under strict aseptic precautions in the operating room. A case is reported in which the patient, a woman 57 years old, had noted a persistent pain in the right upper quadrant for about a month prior to admission to the hospital. On physical examination there was "some suggestion" of a mass in the gallbladder area and the liver was two fingers below the costal margin. Peritoneoscopy showed a markedly distended gallbladder adherent to the liver; the surface was nodular with three "distinct cystic areas." At operation the gallbladder was opened and a fungating carcinoma identified, which biopsy showed to be an adenocarcinoma evidently primary in the gallbladder. Peritoneoscopy may, therefore, be of definite aid in making a diagnosis of gallbladder carcinoma prior to operation, thus making it possible for the surgeon to plan the operative procedure accordingly.

EXPOSURE OF THE RETRO-DUODENAL PORTION OF THE COMMON DUCT

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Illinois M. J., 84:250-51, Oct. 1943

If stones of the common duct lie in that portion of the duct which lies above the duodenum, the approach to them is fairly obvious. If, however, the stone or stones are impacted lower down —that is, in that portion of the common duct which grooves the head of the pancreas, or which lies within the wall of the duodenum itself—then the approach is extremely difficult unless the duodenum is mobilized. Stones are found in these localities in a little over one-fourth of patients with stones of the common duct.

Very frequently, in order to differentiate between impacted stone and carcinoma of the head of the pancreas, it will be necessary to mobilize the duodenum so that the entire lower portion of the common duct can be visualized. Stones in the common duct may be very elusive. The fact that a probe can be threaded through the duct into the duodenum only means that there is no stone obstructing the duct, but not that there is no stone in the duct. Recently the procedure of getting a cholangiogram at the operating table has been of great value in avoiding the overlooking of stones. However, the authors still feel that it is wise to mobilize the duodenum so that they can inspect and palpate the entire length of the common duct in case of doubt.

After the usual steps of the operation have been carried out to the point where the gallbladder, cystic duct and upper portion of the common duct have been exposed, the assistant places his outstretched fingers on the duodenum and draws it downwards—caudalward and medially. This places the evascular peritoneal fold along the outer curve of the duodenum on a stretch. The peritoneum is cut with a scalpel as in the diagram. The index finger of the surgeon can then be inserted into this incision and by blunt dissection the duodenum is very easily freed, the incision into the peritoneum being lengthened by cutting along the inserted index finger. The duodenum can be mobilized as easily as the colon by cutting along its outer edge. The mobilized duodenum

can be turned back upon itself, thus exposing the entire course of the lower common duct. The duodenum is then usually stitched back into position with 2 or 3 interrupted sutures at the end of the operation. 1 diagram.

INCISIONAL HERNIA

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Nebraska State M. J., 28:308-13, Oct. 1943

Following a discussion of the main factors involved in the failure of healing in clean wounds and methods of preventing wound contamination, the author proceeds to describe a plan for the treatment of incisional hernia which is not original but based on an accumulation of other surgeons' experiences as well as his own, which he thinks simplifies the operation and offers a better chance for successful repair. The patient is examined both standing and lying down and an attempt made to determine how far the sac extends laterally underneath the skin, because the fat in this region will be thinner than the normal surrounding fat. It is then considered whether, if this entire fat and skin is excised, it will be possible to draw the skin together at the time of repair. This is usually possible except in very thin persons. The patient rests in bed for several days prior to operation, during which time an effort is made to reduce the hernia and keep it reduced by binders or adhesive plaster. At the time of operation an elliptical incision is made in the area mapped out at examination and is continued downward until the fascia and muscle are reached. The skin over the hernia is not excised at this time. The skin over the hernia is then clipped together over the midline. The neck of the hernia is approached laterally as in umbilical hernia. It is assumed that the type of hernia under discussion will require opening of the peritoneum and replacement of the intestines. With the wound opened laterally and the skin still attached over its surface, it is easy, by gradually everting the sac, to dissect free the various layers of adherent intestine under direct vision. This is carried out until the entire sac has been opened around its circumference. The at-

tached skin, fat and sac wall are then removed in toto. A hernial ring is left where it penetrated the muscle. If one dissects the subcutaneous fat well away from the surface of the surrounding muscles and fascia and until a normal reaction is obvious as shown by lack of adhesions of fascia and fat, the sides of the hernial sac can be approximated more readily. The same process may be accomplished by dissecting the transversalis fascia and peritoneum from the overlying muscles. If the hernia occurs lateral to the rectus muscle, as in a McBurney incision, by dissecting the external oblique from the internal oblique until the adhesions have ceased, one finds that the muscle planes may then be drawn together without tension. A careful anatomical dissection, with a careful silk technic, without utilizing large suture material, will, in a great majority of cases, allow closure then without undue tension. Where there has been a separation of 2 to 3 inches, after the initial excision of the sac these tissues readily come together if the dissection is continued beyond the initial inflammatory zone.

The peritoneum and transversalis fascia should be closed with a fine suture of chromic or silk, and this suture should rather be interrupted than continuous, so that if the suture should tear through or become contaminated, the infection does not continue along the entire suture line. As one comes to the suture of fascia, overlapping is sometimes advisable. If there is not any tension, and the two edges can be approximated with numerous fine sutures without tension, they can be readily united. If in the original incision one has excised all of the atrophied fat and has separated the fat from the fascia, it is then easy to draw the fat together over the fascia with interrupted silk.

There is then no dead space and no need for drains. The skin may be closed at the discretion of the operator in whatever method he is accustomed to, save that there should be no inversion of the skin. The author believes that the interrupted fine silk Stewart stitch prevents undue tension on the skin and does not allow for inversion. By this method the author has had only one recurrence in some twenty-odd incisional hernias.

The cure of incisional hernia must be divided into two stages, i.e., the prophylactic stage by using gentleness in the first operation and avoiding danger of contamination, and the stage of repair by

dissecting beyond the initial inflammatory exudate so that the wound edges may be approximated by small sutures without tension. 7 figures.

A COOPER'S LIGAMENT HERNIOTOMY; CLINICAL EXPERIENCE IN 322 CONSECUTIVE CASES

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S. Clin. North America, 23:1279-97, Oct. 1943

A Cooper's ligament herniotomy (suture of the transversalis fascia and attached structures to Cooper's ligament) has been done in the repair of 322 groin hernias in 259 patients at Henry Ford Hospital, from April 23, 1940 to June 24, 1943. The senior author has used this technique for all groin hernias since August 31, 1941. This operation has been employed for all the usual types of groin hernia, i.e., indirect and direct inguinal hernias and femoral hernias. After exposure of the external ring, the external oblique aponeurosis is split in the direction of its fibers; the indirect sac, which is present even in normal individuals, is located and opened; exploration with the finger tip should always be carried out after opening this sac. If a direct sac or "weakness" is present, the direct and indirect sacs are converted into one by Hoguet's method. This same procedure can be used to convert a femoral sac into an indirect sac; in some cases all three sacs can be converted "into a single indirect sac." The indirect sac, whether simple or enlarged by conversion of the direct and/or the femoral sac into it, is then closed by an internal purse-string suture placed as high as possible, using No. 5 heavy silk and a round, non-cutting needle. The internal ring is closed by "a plastic stitch" in the transversalis fascia, and the internal oblique relaxed by cutting it just lateral to its junction with the external oblique. The transversalis fascia and often the internal oblique conjoined tendon formed "the upper leaf" of the repair, and Cooper's ligament the lower leaf. "Red" muscle must not be included. The most lateral suture is placed first, usually 4 cm. lateral to the pubic spine, and tied. Three or four more sutures are placed between this first suture and the pubic spine;

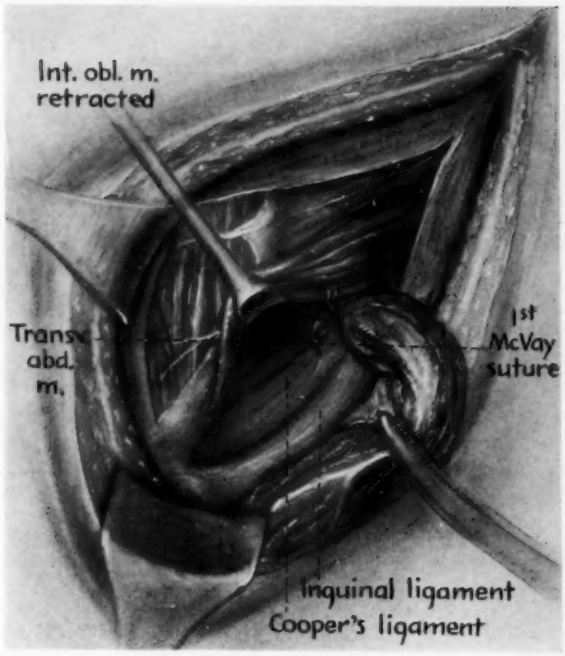

FIG. 366.—The first Cooper's ligament suture has now been placed. This is inserted through the transversalis fascia and adjoining conjoined tendon above and Cooper's ligament below. The most lateral suture is placed first. This is separated from the femoral vessels, which lie laterally, by the tip of the left index finger of the operator, which is held tightly in contact with the pubic bone underlying Cooper's ligament.

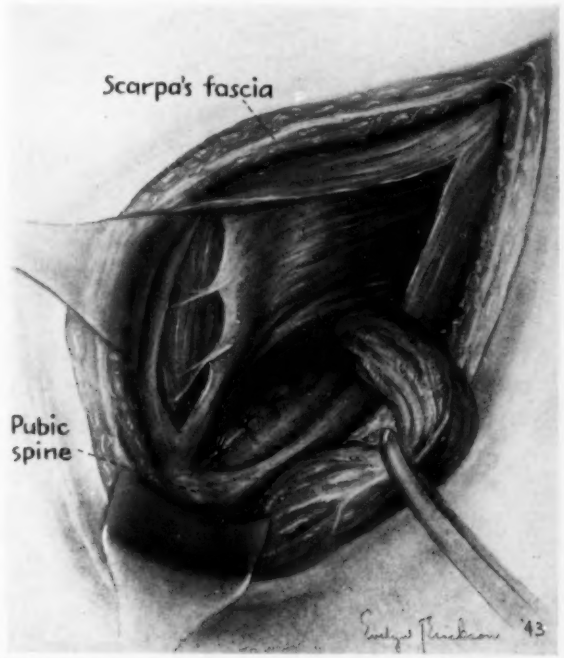

FIG. 367—All of the Cooper's ligament sutures (usually four or five) have now been placed. The most medial two or three of these sutures also pass through the lacunar (Gimbernat's) ligament. The cord is then dropped into the dead space and the external oblique, Scarpa's fascia, and skin are closed with interrupted silk sutures in layers over the cord.

(Illustrations through courtesy of W. B. Saunders Co., Phila., Pa.)

the most medial of these sutures usually passes through Gimbernat's (lacunar) ligament as well as Cooper's ligament. The suture material is double No. 5 heavy braided silk, and the needle used is a small round curved Mayo needle with a needle holder, preferably a Bland needle holder; the double strands of silk are made into a triple knot, and the individual strands are then separated and tied in pairs. In the earlier operations, the external oblique aponeurosis was closed beneath the cord (Halsted procedure); in the more recent operations, the external oblique aponeurosis was closed over the cord, and the latter "dropped" into the dead space left (Bassini method). Scarpa's fascia is closed with "small bites" of the suture; the skin is closed with interrupted silk end or mattress sutures. The series of 322 groin hernias repaired by this method included 141 simple indirect inguinal hernias and a large percentage of direct inguinal hernias (80 cases); there were 31 cases of recurrent inguinal hernias. Of the 112 cases operated on two years or more ago, only 35 have been followed up for the entire period since operation. Only one recurrence has been found in this group; this was a case of bilateral hernia, in which the Halsted method of closing the aponeurosis was employed; the recurrence was only on one side. The theoretical basis of this operation is that it attempts to restore "the normal attachments" of the transversalis and internal oblique fibers to Cooper's ligament; practically it has the advantage that an identical technique can be used for all types of groin hernia. The results in the cases reported indicate that "the procedure justifies its theoretical advantages."

USE OF FASCIAL SUTURES IN INGUINAL HERNIA

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Surg., Gynec. & Obst., 77:530-33, Nov. 1943

From a brief review of the development of fascial sutures in the repair of hernia, the author finds that the use of living fascia is gradually "gaining in popularity." In his own work, he uses fascial strips taken from the iliotibial tract by means of the Masson stripper. A simple sandle with an adjustable canvas strap has been

devised to hold the femur in internal rotation during this procedure. With this device the stripper can be held parallel to the vertical and longitudinal planes of the thigh; this facilitates its use and reduces the liability of tearing the strip or altering its size. In the past five years the author has employed fascial sutures taken in this way from the lateral surface of the thigh in the repair of 385 inguinal hernias; 321 of these patients have been followed up for one to five years. In this group there were only 3 recurrences (0.9 per cent) and 3 cases of testicular atrophy; in the entire series there were 3 infections and 5 hematomas; all of the hematomas were easily evacuated without delaying the patient's recovery. There were no herniations or other untoward effects at the donor site in any of these cases. One death occurred in this series, but, as proved at autopsy, it was unrelated to the operative procedure. In 457 herniorrhaphies in which silk sutures were used (reported in 1940) the author had a recurrence rate of 7.5 per cent. The method of fascial repair was used in recurrent and in the "more difficult" cases of hernia in patients in the fifth and sixth decade of life.

LIVING FASCIAL SUTURES IN THE REPAIR OF INGUINAL HERNIA

WILLIAM JOHN RYAN

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Surg., Gynec. & Obst., 77:535-38, Nov. 1943

After a study of various methods of repair of inguinal hernia with living fascia, the author and his associates decided to use a strip of fascia "split off" the upper leaf of the aponeurosis of the external oblique, with its lower end attached to the spine of the pubis. A Gallie needle was used in the first few cases, but in most cases a Bisgard needle has been used. Depending on the conditions in each case, the fascial suture is either carried through the shelving edge of Poupart's ligament, or the internal oblique muscle is first "picked up" in the suture and then through the edge of Poupart's ligament. The fascial suture is carried up to just below where the cord emerges, and fixed in the belly of the internal oblique muscle by interrupted sutures; above the cord, the closure is completed by interrupted sutures. If it can be done without

tension, the remaining part of the upper leaf and the lower leaf of the external oblique aponeurosis are sutured beneath the cord; but, if not, both leaves are sutured to the internal oblique muscle. Following operation, the patient is placed in the semirecumbent position with the knees flexed; he is kept in bed for fourteen days and discharged from the hospital two days later. If he is engaged in heavy work involving climbing and lifting, he should not return to work for three months after operation. This method of repair of inguinal hernia with living fascia has been used in 106 cases, 12 of which were direct; 92 of these patients have been followed up since they returned to work and no recurrence has developed in a period of six months and more.

THE PLICATION OF THE INTERNAL OBLIQUE MUSCLE IN THE REPAIR OF DIRECT AND RECURRENT HERNIAS

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Pennsylvania M.J., 47:229-30, Dec. 1943

Following a brief review of the three most frequently used types of operation for hernia and their modifications, the author states that the reason for the numerous variations is an attempt to prevent recurrences. There are 3 to 7 per cent of recurrences after operation for direct hernia. One problem in the repair of direct hernia is the redundance of the teased out fibers of the internal oblique muscle, which are the result of the constant pressure of the sac. A method for reefing this muscle is suggested whereby additional support may be given to this area.

In preparation for this procedure, it is necessary to dissect back the medial portion of the aponeurosis of the external oblique muscle to expose a generous portion of the internal oblique muscle and the margin of the rectus sheath. The exposed portion of the external oblique muscle is considered as divided into three portions, and a fascial suture is placed at right angles to the fibers in each of the three divisions. The cord is supported out of the wound, and with the ox fascia or a homogeneous fascia on a Gallie needle a generous bite is taken in the sheath of the rectus muscle,

and successive bites through the internal oblique muscle until its margin is reached. A generous bite is taken in the shelving portion of Poupart's ligament. The suture takes alternate stitches through the internal oblique muscle in returning to the beginning point of the suture. A similar stitch is placed in each of the other two divisions of the internal oblique muscle. Several interrupted sutures of double 0 chromic catgut are placed between the margins of the internal oblique muscle and the shelving portion of Poupart's ligament between the fascial sutures. These are tied as placed. It is well to be sure that the internal ring is well supported. The fascial sutures are then tied moderately firmly. This produces a puckering of the internal oblique muscle, both in the direction transverse to its fibers and parallel to its fibers. The aponeurosis of the external oblique muscle is then sutured beneath the cord by interrupted or continuous sutures of catgut. Several interrupted sutures are placed in the fatty layer of the above cord, and the skin is closed in the usual manner. All accessory hernial openings must be closed. The author feels sure that this method will prevent a certain number of recurrences. 4 figures.

THE TRANSVERSE LOW ABDOMINAL INCISION

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Calif. & Western Med., 59:215-18, Oct. 1943

The transverse low abdominal incision used by the author is a modification of the Maylard or Bardenheuer incision, "which, in turn, is an outgrowth of the approach devised by Pfannenstiel." The skin incision is curvilinear, beginning and terminating one to two finger breadths below and medial to the anterosuperior iliac spine on each side, and crossing the midline "just within the upper pubic hair line." The incision is carried through the subcutaneous tissue to the aponeurosis of the external oblique muscle and the anterior sheath of the recti, clamping and ligating such blood vessels as necessary. The anterior sheath of the rectus muscle is "nicked" on each side of the midline, and then divided transversely with scissors; the incision is then extended through the aponeuroses of the external and internal oblique muscles; this exposes the recti

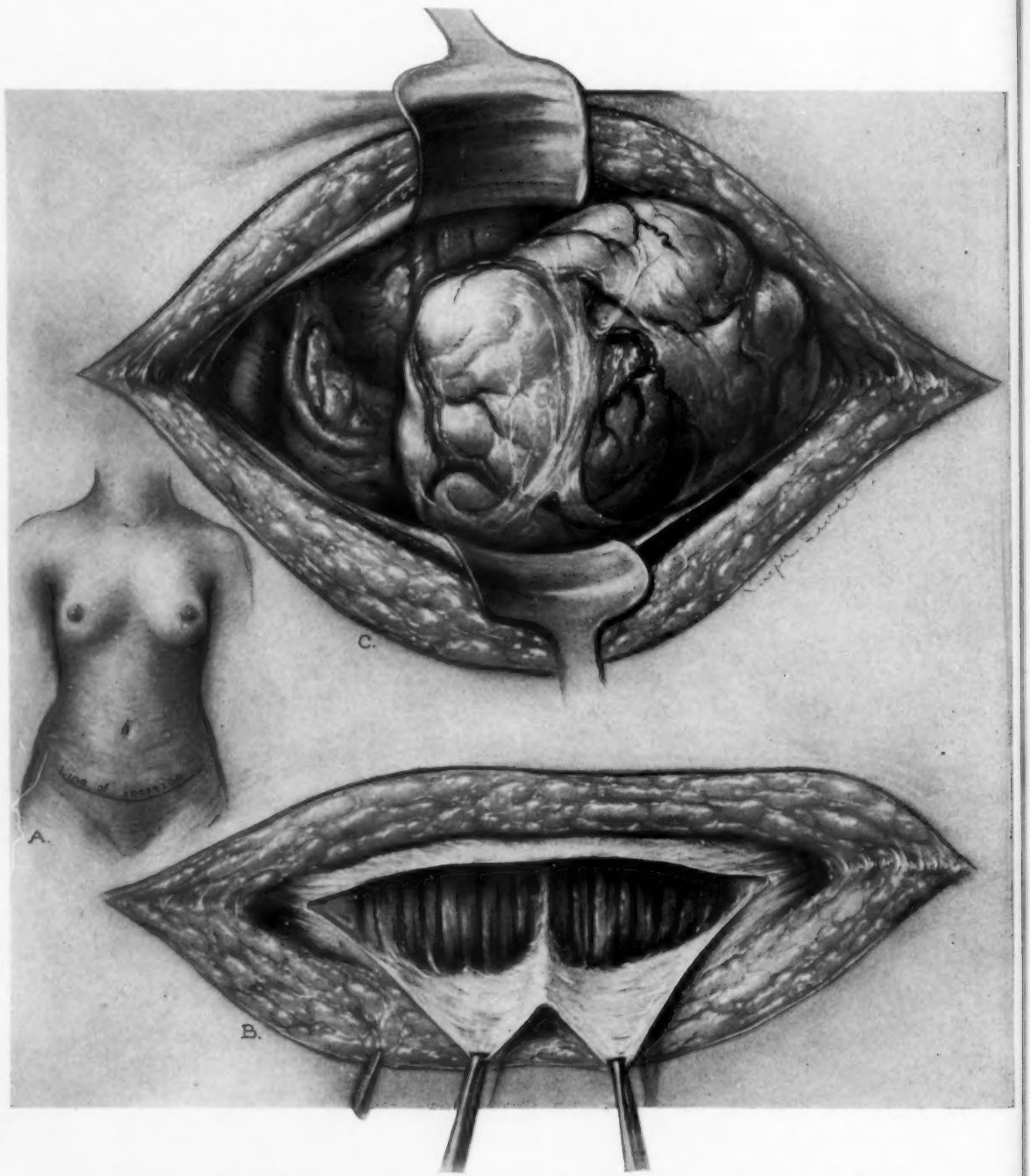

FIG. 1.—*A*. The line of incision. *B*. Elevation of the lower flap of the rectus sheath. *C*. The resultant exposure. The particular tumor was a large ovarian cyst, intraligamentous, filling the entire true pelvis and projecting into the false pelvis.

(Illustrations through courtesy of California & Western Medicine)

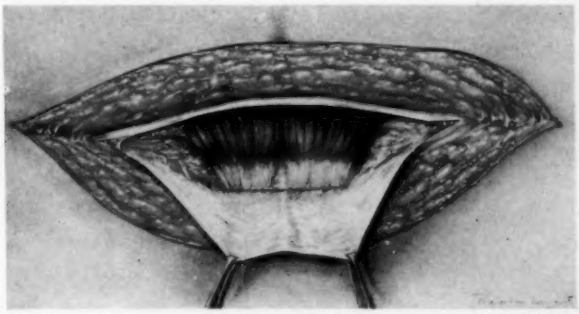

FIG. 2a.—The lower flap of the rectus sheath, elevated to expose the tendinous ends of the recti. The dotted line indicates where they are to be divided. Note the fibers of the internal oblique muscle showing at either end of the incision in the fused aponeurosis of the oblique abdominal muscles.

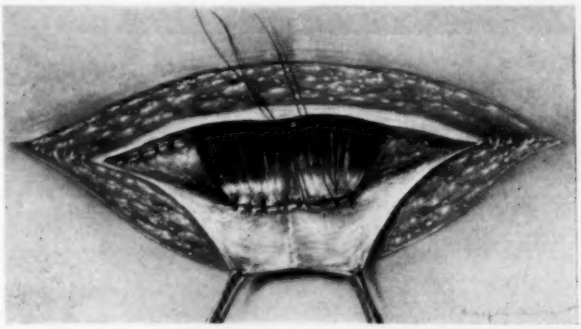

FIG. 2b.—Showing suturing of the recti to the lower flap of the rectus sheath. A second row of sutures may be inserted if desired.

in the center, the fascia transversalis and peritoneum laterally. The lower flap of the rectus sheath is grasped and separated from the rectus muscle by gauze dissection; a septum, extending from "the deep aspect of the sheath" between the margins of the two recti, must be "snipped" with scissors with care not to injure the rectus sheath. The recti are cut at "their very insertion" into the pubis where they are fibrous, often entirely tendinous; they are then turned upward. The peritoneal cavity is entered at each end of the incision under the lower flap of the rectus sheath. In closing this incision, after closure of the peritoneum in the usual way, the pyramidalis muscles are allowed "to fall on top" of the peritoneum, either without any sutures or with a single suture attaching their apex to the deep aspect of the recti. The ends of the rectus tendons are united to the under surface of the rectus

sheath with mattress sutures. The reattachment of the recti may involve some difficulty; it is facilitated by "breaking" the operating table so as to flex the patient's pelvis on the trunk; the anesthesia, which has been light throughout the operation, may be deepened at this stage. The author has found that this incision gives adequate exposure for all operations on the lower sigmoid, upper rectum, the region of the bifurcation of the aorta, and "the organs contained in the broad ligament." While this incision is not designed for general exploration of the abdomen, it permits palpation of the liver, and the performance of "incidental appendectomy" if indicated, unless the appendix lies unusually high. With general anesthesia, this incision permits a light anesthesia, except when the rectus muscles are reattached, as no muscular relaxation is required at other times; with spinal anesthesia, the anesthesia does not need to extend above the level of the eleventh segment of the thoracic cord, at which level there is less depression of blood pressure. Little packing is required to keep the small intestines out of the operative field, therefore there is less postoperative distention; with this low incision, pain is not aggravated by breathing or coughing, and there is, therefore, less inhibition of respiration, resulting in a reduction in the incidence of pulmonary complications. In the author's experience, the resulting wound has been strong. He attributes this to the following factors: The incision is "staggered" so that the different layers of the abdominal wall are not weakened in the same place; no muscle is denervated; all sutures are taken in aponeurosis or tendon; and the direction of the main muscle pull is parallel to the direction of the incision. The appearance of the scar is good, as the part which is not hidden by the pubic hair follows the natural lines of the skin.

THE DIAGNOSIS OF PANCREATIC DISEASE

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New York State J. Med., 43:1847-55, Oct. 1, 1943

The early diagnosis of acute pancreatic disease (acute edema and acute pancreatic necrosis) is important to distinguish such conditions from other acute abdominal conditions in which opera-

tion is indicated, whereas operation in even severe cases of acute pancreatic disease is now considered to be "unwarranted." Early diagnosis of cancer of the pancreas is important, as it has been shown that "life can be prolonged and suffering lessened by operation." In acute pancreatic disease, the clinical picture is varied and obscure and diagnosis can rarely be made on the basis of symptoms and physical signs alone. The most valuable diagnostic test in acute pancreatic edema and acute pancreatic necrosis is the diastase test of serum and urine, as there is a marked increase in both the serum and the urinary diastase at the onset of acute symptoms, but the diastase content drops rapidly although the disease is progressive; the urinary diastase may show an increase, however, after the blood diastase has returned to normal. The lipase test is also of value as an increase in serum lipase occurs early in acute pancreatic disease; the diastase test can be much more quickly performed, and repeated daily. Diastase determinations are of special value in diagnosis of acute pancreatic disease, as a diminution of the diastase gives early increases an added significance.

The most common symptoms of carcinoma of the pancreas are loss of weight and recurrent abdominal pain; the pain is not necessarily localized in the epigastrium, but may involve any part of the abdomen and may extend to the back. In carcinoma of the pancreas, the lipase test is of more diagnostic value than the diastase test and is more frequently positive. The secretion test (intravenous injection of secretin) and the mecholyl test (subcutaneous injection of mecholyl chloride) are both of value in the diagnosis of cancer of the pancreas and chronic pancreatitis; both these substances stimulate the pancreatic secretion in normal persons and fail to do so in cancer of the pancreas. Examination of the stools should also be made for undigested muscle fibers, the presence of which is an indication of diminished pancreatic digestion; the nitrogen content of the feces is also increased if the pancreatic ducts are occluded. In cases of cancer of the pancreas in which there is obstructive jaundice, a cholecystojejunostomy relieves obstruction. In some cases the operation described by Whipple is indicated—removal of the head of the pancreas and second portion of the duodenum; in such cases implantation of the

stump of the pancreas into the wall of the stomach or jejunum is indicated, in order to prevent the loss of the "essential pancreatic juice."

THE RECOGNITION AND MANAGEMENT OF ACUTE TRAUMA TO THE PANCREAS WITH PARTICULAR REFERENCE TO THE USE OF THE SERUM AMYLASE TEST

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Ann. Surg., 118:594-602, Oct. 1943

No particular group of symptoms or abdominal findings can be considered as diagnostic of injury to the pancreas but determination of the blood serum amylase makes it possible to recognize many such lesions, soon after they have occurred. Nine illustrative cases are described to show the different ways in which the pancreas may be injured and the consequent changes in the serum amylase. During the past five years 1,800 amylase determinations, including those in 8 cases of trauma to the pancreas, have been made in the University of California Clinical Biochemistry Laboratory at the San Francisco Hospital. In each case of injury to the pancreas the serum amylase was above the maximum normal level (180 Somogyi units) some time after injury. This increase probably results from leakage of the enzyme from the injured acini and ducts into the interstitial spaces, or into the peritoneal cavity, or both; thence, it is absorbed into the blood. In most cases there is a rapid rise and fall of the serum amylase following injury to the pancreas. Obviously it is advantageous to be able to detect evidence of trauma to the pancreas before undertaking an operation for serious injury to the abdomen. If the serum amylase is high the surgeon must proceed cautiously in this region. When objective evidence of intra-abdominal injury is absent or uncertain, an increase in the serum amylase level occasionally may be the earliest sign of injury to the pancreas.

Lacerations of the pancreas, stab wounds and tearing injuries may be closed with nonabsorbable sutures such as silk or cotton. Contused lacerations such as those received with gunshot wounds

and contusions from blunt or nonpenetrating injuries usually cannot be closed. Soft rubber-tissue drains should be placed adjacent to the injured pancreas, and often these drains may be brought to the surface of the body through a small separate incision in the flank. Drainage possibly does some good in preventing diffuse peritonitis or the formations of pancreatic pseudocyst. In some cases pancreatic fistula forms as a result of injury to the pancreas. The skin surrounding the drains should be well protected against the possible corrosive action of the enzymes. Food should be withheld and supportive measures maintained for several days, especially if the serum amylase remains elevated or fluctuates, or if secondary elevations occur. 7 references. Discussion by Dr. Robert Elman, of St. Louis, Mo.

Surgery of the Kidney

SULFATHIAZOLE TOXIC NEPHROSIS AND KIDNEY DECAPSULATION

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Surgery, 14:570-73, Oct. 1943

Some of the renal complications following administration of sulfonamides have proved fatal. In one type the renal changes are due to the drugs, causing concretions or precipitates. Various workers have failed to find crystals in kidneys removed at autopsy following death presumably due to sulfonamides. Therefore there must occur another renal change which produces the oliguria, anuria and uremia complex which appears. In three autopsies Prien and Frondel revealed degeneration, necrosis and edema. Long, Haviland, Edwards and Bliss believe that anuria is due to a true toxic injury of the tubules, probably similar to that in mercury bichloride poisoning.

The measures used in treatment of renal complications are the withdrawal of the drug, alkalinization, forcing of fluids, by mouth or parenterally, and local heat or diathermy to the kidneys. One should guard against allergy or hypersensitivity when using the drug. When these simple methods fail, ureteral catheterization is done to wash out concretions if present. If, however, the renal complication is of the toxic type, this usually is of little benefit. It is in a case of this kind that renal surgery offers the patient a chance of recovery.

A case is reported in detail of a patient suffering from anuria, complicating the administration of sulfathiazole. The condition became desperate owing to what appears to have been a "sulfa-nephrosis." In this case the patient's life was saved by unilateral renal decapsulation and nephrotomy. If decapsulation and nephrotomy are done early, before the kidney damage is too marked, and other tissue changes have taken place, a much better chance of recovery can be expected. Decapsulation relieves the pressure and edema, and then allows restoration of the cells and function. 5 references.

Surgery of the Blood Vessels and Lymphatics

SYMPATHECTOMY IN THE TREATMENT OF PERIPHERAL VASCULAR DISEASE

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Illinois M.J., 84:373-79, Dec. 1943

Following a brief reference to two cases of sympathectomy without satisfactory results, done before the author had a thorough knowledge of the indications for this operation, the author states that since the time when these operations were performed, in 1928, he has a record of 195 sympathectomies performed for vascular disease. Of these, 126 were lumbar, 38 cervical and 31 dorsal sympathectomies. Modifications in technic have led to superior results. In the author's clinic many methods have been used to determine how much of the diseased vascular bed is capable of dilating and how much of it is so permanently damaged that no vasodilation is possible. None of these methods are as reliable as the direct infiltration of the sympathetic chain with novocaine, followed by determination of skin-temperature or an oscillometric curve. These measure the capacity of the vascular bed to dilate when its sympathetic supply is interrupted. They do not necessarily measure vasospasm, since a certain amount of vasomotor tone is always present. For practical purposes a small, inexpensive skin thermometer (mercury) is satisfactory. If the oscillometer is available, the increased oscillations following a block of the sympathetics may well demonstrate the increase in circulation.

The indications for sympathectomy in Raynaud's disease are lack of marked structural damage to the vessels and absence of sclerodactylia. In Buerger's disease the indications are absence of the acute phase, good collateral reserve, and an age of less than fifty years. In poliomyelitis, sympathectomy is indicated for vasospastic, painful limbs, preferably between the ages of six and ten years. Good but fleeting response to sympathetic block may

be expected in causalgic states such as Sudeck's atrophy, reflex dystrophy and spreading neuralgia. Good results have also been obtained in a miscellaneous group of conditions including acute arterial emboli or thromboses, arterial or arteriovenous aneurysm, livedo reticularis and hyperhydrosis.

The results of sympathectomy in Raynaud's disease have improved steadily due to a better selection of cases and to a technic influenced by Smithwick. With this technic recurrent sweating has not been observed.

In Buerger's disease the extent of vascular damage is important. Good results may be expected in a patient whose major arteries are closed but whose terminal bed is intact from sympathetic block followed by sympathectomy. The prognosis of patients who suffer from a more peripheral arteriolar involvement is much worse. In fact, sympathectomy may aggravate some of these cases. The latter type may be diagnosed by the absence of a rise and the presence of a fall in temperature of the toes following sympathetic block. In such cases it is wise to combine lumbar sympathectomy with amputation of one or several toes. This method promptly relieves the patient's complaints and restores his earning power. Following sympathectomy, the patient must continue complete abstinence from tobacco and a scrupulous foot hygiene. The disease may affect other extremities or may even flare up in the sympathectomized limb, in which case it may be necessary to resort to amputation.

In poliomyelitis only patients exhibiting vasospasm are suitable for sympathectomy. Only about one-third of cases in children show such involvement.

Continuous burning pain first localized and then spreading, following mild injury, associated with vasodilation, may respond in early stages to repeated infiltrations of procaine to the sympathetic ganglia. In the stage of spreading neuralgia, which does not respond to sympathetic block, surgical methods including nerve section, posterior root section or chordotomy are of no avail. It seems paradoxical that sympathetic paralysis should be of benefit. It relieves the throbbing, burning pain and diverts blood from the capillary bed.

Lumbar sympathectomy is done at present in two stages a week

or ten days apart with a muscle splitting, anterolateral, extraperitoneal incision. The anesthesia is intratracheal ether or a spinal anesthesia reaching to the 6th dorsal segment. The patient is on his back with a slight elevation of the operated side and a flexion of the homolateral hip and knee. The ganglionated chain is removed from the level of the sacral promontory to the diaphragm. For sympathetic denervation of the upper extremity, the author uses the preganglionic sympathectomy described by Smithwick. There was only one death in the series of 195 sympathectomies. 12 references.

TRANSPLEURAL INTRATHORACIC LIGATION OF THE LEFT COMMON CAROTID ARTERY. THE FIRST CASE REPORT

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Columbia, S. C.

J. Thoracic Surg., 12:659-67, Oct. 1943

A review of the available literature has failed to reveal any reference, suggestion, or application of a transpleural, intrathoracic approach to the ligation of the left common carotid artery. A case of malignant melanoma of the neck in a soldier of 21 years of age was treated by this method at the Brooke General Hospital. A radical neck gland dissection on the left side was performed. A large hematoma forming on the twenty-fifth postoperative day was evacuated and promptly a massive hemorrhage of 600 cc. of blood resulted before the bleeding could be controlled by digital compression. The wound was opened under local anesthesia, revealing gross ulceration of the common carotid artery at the site where the external carotid artery had been ligated. An attempt was made to ligate the common carotid artery but on the second post-operative day it was obvious that this occlusion of the common carotid artery would not be sufficient to prevent a fatal outcome. The only method which seemed anatomically and surgically sound was ligation of the artery in an area free of infection. The intrathoracic portion of the left common carotid artery fulfilled these

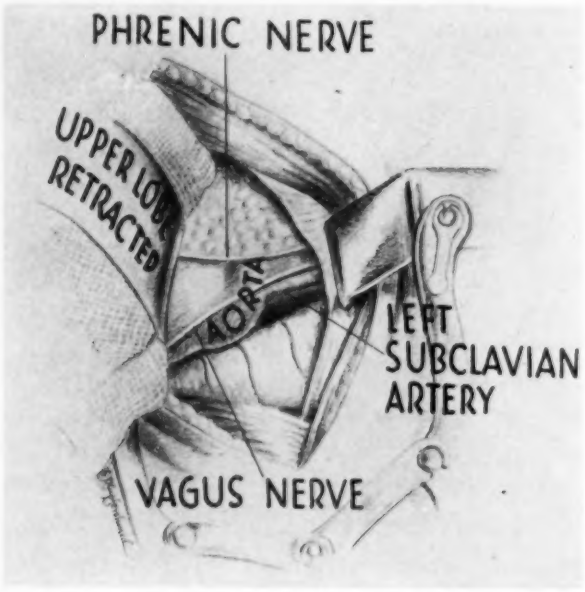

FIG. 3.—Anatomic landmarks on retraction of upper lobe downward.

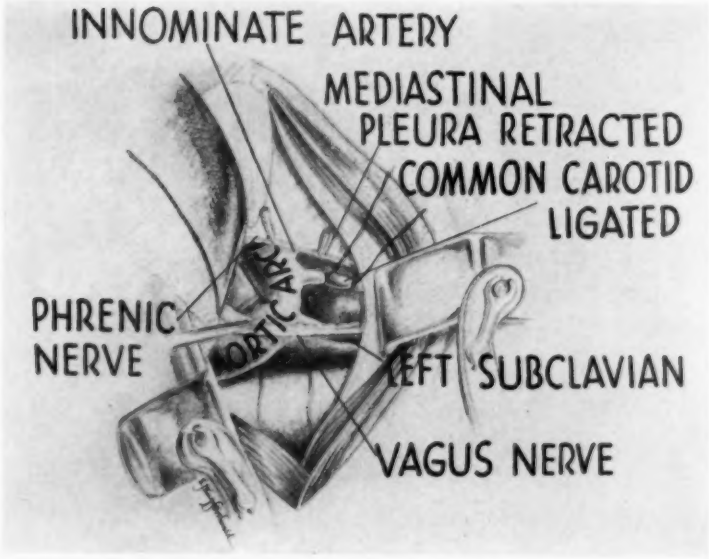

FIG. 4.—Exposure of left common carotid artery; note adaptability of subclavian and innominate arteries to ligation.

(Illustrations through courtesy of The C. V. Mosby Co., St. Louis, Mo.)

requirements. Seven days following the mass ligation, the condition appeared right for intervention. Digital pressure controlled bleeding after loss of another 500 cc. of blood before the patient could be transported to the operating room.

A transverse skin incision was made over the second intercostal space beginning at the lateral border of the sternum on the left and extending to the anterior axillary line. The pectoralis major and minor muscles were divided in a line with their fibers and the left pleural cavity was entered through the second intercostal space. The internal mammary vessels were doubly ligated and divided. It was not necessary to divide the rib cartilage. A rib spreader was introduced and the upper lobe of the lung was covered by a moist pack and retracted downward until the superior aspect of the hilus of the lung was visible. The mediastinal pleura was opened over the arch of the aorta and the incision extended upward for a distance of 3 inches midway between the phrenic nerve anterior and the vagus nerve posterior. On dissecting the posterior leaf of the mediastinal pleura with the vagus nerve, the subclavian artery was easily exposed and identified. The anterior leaf of the mediastinal pleura was now mobilized with the phrenic nerve and the left common carotid artery came readily into view. The intrathoracic portion of the artery was 4 cm. in length. Two ligatures of No. 8 braided silk were tied 1 cm. apart about the left common carotid artery 2 cm. from the arch of the aorta. It was observed during the development of the carotid artery that the ligation of the innominate artery could also be carried out through this approach. The mediastinal pleura was closed with interrupted sutures of fine silk. The pleural cavity was washed with physiologic saline solution. The lung was re-expanded by positive pressure and the pleural cavity and the wound were closed without drainage. Five hundred cc. of citrated blood were given before the operation and another 500 cc. during the course of the operation. The left pleural cavity was aspirated on two occasions, yielding 100 cc. of serosanguineous fluid and 650 cc. on the first and third postoperative days respectively. A left lower lobe pneumonia developing on the third postoperative day cleared up in ten days with sulfadiazine therapy. He had completely recovered on the twenty-first postoperative day, the neck wound healing in

forty-two days. At this time the larynx was normal and the eye grounds were normal. The Horner's syndrome had improved, and there was no evidence of a recurrence of the initial lesion.

It appears as if this transpleural, intrathoracic approach would be of use in the management of an actual or impending hemorrhage secondary to a diffuse neck infection, in arteriovenous fistulas and aneurysms situated low in the cervical region, and in traumatic injuries of the neck accompanied by massive hematomas. In such cases this procedure may be used alone or in combination with some other suitable procedure in the cervical region.

It is anatomically feasible to use a left-sided approach in ligating the first part of the left subclavian, the left common carotid, and the innominate artery. Through a right-sided approach it is possible to ligate the innominate, the right common carotid, and the first part of the right subclavian artery. 13 references. 5 figures.

SUCCESSFUL LIGATION OF THE LEFT COMMON ILIAC VEIN FOR THROMBOPHLEBITIS COMPLICATED BY PULMONARY EMBOLI

RICHARD T. SHACKLEFORD (Major, M.C., A.U.S.) and
RICHARD WHITEHILL (Captain, M.C., A.U.S.)

Bull. Johns Hopkins Hosp., 73:307-12, Nov. 1943

For a patient with pulmonary infarction caused by an embolus from a thrombophlebitis, there is real danger to his life, and therapeutic measures, if reasonably successful, may justifiably be radical. The use of heparin and dicoumarin can probably decrease somewhat these high mortality figures. The authors did not have these substances available and have no experience with them. Moreover, they believe that greater success can be achieved by surgical procedures which isolate the site of the embolus formation from the general circulation. The case of a young soldier is described in which a pulmonary infarct had occurred at least six weeks before he was admitted to the hospital. From the history it appeared that this infarct took place about 5 weeks before the subjective symptoms of thrombophlebitis. There was nothing to explain the etiology of the latter. There had been

no operation and no trauma. The soldier had been fighting under severe living conditions, had lost a good deal of weight, and probably had had malaria. He presented an extensive thrombophlebitis involving the upper portion of the left femoral and internal saphenous veins, and the whole of the left external and common iliac veins, and he had at least two episodes of pulmonary infarction. Before operation there was almost no edema of the left leg, nor did edema increase after the operation. The veins were already completely obliterated, and ligation and division of the common iliac vein could not increase this obstruction. It could conceivably prevent the subsequent development of recanalization of the veins.

The authors believe that ligation of a vein above the site of thrombophlebitis is the most effective procedure in the prevention of pulmonary infarction. It seems to them a more logical measure than the administration of an anticoagulant. The use of venography may aid in the diagnosis of thrombophlebitis. Also the use of anticoagulants postoperatively in patients known to be susceptible to the development of thrombophlebitis, may decrease the frequency of thrombophlebitis. Four weeks after the operation, the present patient was permitted up and began walking. He had regained 25 pounds and there was a minimal swelling of the leg which could be controlled by means of an elastic bandage. 6 references.

ROENTGEN RAYS IN THE TREATMENT OF CERVICAL LYMPHADENITIS

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Radiology, 41:464-67, Nov. 1943

Four hundred and nineteen patients with lymphadenopathy were treated in the Radiation Department of Bellevue Hospital during 1924 to 1941, inclusive. Of the 419 patients, 305 had positive biopsies and in 12 positive tuberculous cultures were obtained from aspiration of the fluctuant nodes. The other 102 patients were accepted for therapy because of clinical findings.

No standard method of treatment for all patients is possible. The factors used vary with age, race, and extent of the disease. In children and younger patients with superficial lesions, low-voltage or medium-voltage x-ray therapy was given. The factors used were 100 to 120 kv., 5 ma., 2-4 mm. Al, 30 to 40 cm. T.S.D., portal sufficient to cover the area involved; 100 r were given at a treatment once or twice a week, up to a total of 600 to 800 r, measured in air. In colored patients pigmentation of the skin is frequently seen after one or two treatments; continuation of therapy in these cases is guided by the clinical response. Incision and drainage are frequently necessary when the mass becomes fluctuant.

In patients with deep, large nodes, particularly where several nodes had become confluent, deep x-ray therapy was employed, the factors in these instances being 200 kv., 5 ma., 0.5 mm. Cu., plus 1 mm. Al filter; 0.9 H.V.L., 40-50 cm. T.S.D.; 100-150 r were given at a time, one area being treated twice a week. The size of the irradiated field varied with the extent of the lesion. The total dose given was 700 to 900 r in air. This was repeated, if necessary, in six to eight weeks.

A study of the 419 patients indicated that roentgen therapy combined with well-guided surgery is the most practical method of treating tuberculous lymphadenitis. It was found that active pulmonary tuberculosis was present or developed subsequently only if the supraclavicular, axillary, or mediastinal nodes were involved. In 310 patients followed up, there was complete disappearance of the lesions in 178, partial disappearance in 101, and slight improvement in 31. In 9 patients active tuberculosis of the lungs developed following treatment. It was believed that in these cases possibly latent tuberculosis was aggravated by roentgen therapy. The age incidence in this series varies from three weeks to 70 years, the largest age group being that from twenty to thirty years. 9 references.

Surgery of the Bones and Joints

METHODS OF MORTALITY REDUCTION IN AMPUTATIONS FOR ARTERIOSCLEROTIC GANGRENE

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Rocky Mountain M.J., 90:663-65, Oct. 1943

In 1938-39 there were 48 thigh amputations done at the Colorado General Hospital for gangrene due to vascular disease, with 7 deaths, a mortality of 46 per cent. In 1940-41, when sulfanilamide was used locally in the wound, there were 20 thigh amputations, with 4 deaths, a mortality of 20 per cent. Since February, 1942, refrigeration anesthesia has been employed for thigh amputations in patients with vascular disease; the local application of sulfanilamide in the wound has been continued. In this period 12 thigh amputations have been done with no deaths. A "tank" is used for refrigeration; a rubber sheet is placed underneath it and the tank filled to a depth of 2 inches with crushed ice. The extremity is placed in the tank, the upper thigh being protected from pressure on the edge of the tank by a rubber sponge; and is then covered with cracked ice filling the tank. A rubber sheet is filled with ice and pulled through the hole in the upper end of the tank, "serving as a pouch" and providing anesthesia for "the uppermost" part of the thigh. The large rubber sheet underneath the tank is then drawn up to cover it; a stop-cock at the base of the tank drains into a bucket at the bedside. The head of the bed is slightly elevated on "shock blocks" to aid drainage. For thigh amputations, the process of refrigeration is started four hours before operation, after giving the patient a sedative. Two hours before operation a tourniquet is applied at the level indicated. This causes no pain, as the tissues are "numbed." The patient is brought to the operating room in his bed and the ice is not removed until the surgeon and his assistants are ready. Cold instruments and cold sponges are used throughout the operation. Before severing the sciatic nerve, it is injected with 1 per cent novocaine; otherwise no other form of anesthesia is employed. After operation ice bags are applied to the stump for twenty-four to forty-eight hours, so

that the return to normal temperature is gradual. Usually there is little postoperative pain; and the patient can take a full diet immediately. The wound healed per primam in all but one of the 12 cases operated under refrigeration anesthesia.

REFRIGERATION ANESTHESIA FOR AMPUTATION

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Bull. School Med. Univ. Maryland, 28:80-92, Oct. 1943

For refrigeration anesthesia to be successful, all circulation to the extremity must be shut off; this is best done by the application of an elastic round rubber, half inch tube as a tourniquet. For refrigeration, cracked ice is employed and a metal lined box in which the ice can be closely packed around the extremity. The skin should be chilled with ice for twenty to thirty minutes before the application of the tourniquet, which otherwise may cause pain. The amputation and tourniquet levels must be carefully planned in advance, so that the surgeon has "ample room" between the tourniquet and the amputation site for "clean-up" and formation of flaps. Two and a half hours' refrigeration with a tourniquet is required for a low or midthigh amputation, two hours for amputation in the upper third of the leg, one and one-half hours for the lower third of the leg, and one hour for a toe or metatarsal amputation. Before the patient is brought to the operating room, the ice packing is removed from around the extremity and uncovered ice bags applied; iced solutions are used for cleansing the operative site and iced saline solution throughout the operation; any visible blood vessels are clamped and ligated. After operation the stump is surrounded with uncovered ice bags to maintain a low temperature. The method of anesthesia is indicated chiefly for patients who are poor risks and unable to "stand" a general anesthetic. It is of special value in diabetic patients, as the diet can be maintained pre- and postoperatively without gastrointestinal disturbances. In cases with a badly infected or gangrenous extremity, the application of ice and the tourniquet result in physiological amputation, so that toxins are no longer

absorbed and pain is relieved. This makes it possible to carry out better preoperative preparation with transfusions, intravenous fluids and other measures indicated. In 11 amputations in which this method of refrigeration anesthesia was used, 9 wounds healed by first intention or are healing well; a slight wound infection developed in one case, which is now healing satisfactorily; one required a secondary operation because of "pocketed" infection; and one patient (with thromboangiitis obliterans) died.

REFRIGERATION ANESTHESIA OF THE EXTREMITIES; A STATISTICAL STUDY

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Am. J. Surg., 62:231-34, Nov. 1943

Refrigeration anesthesia has been employed by the authors for operations on the lower extremities in patients with diabetic and arteriosclerotic peripheral vascular disease. Diabetes can be much better controlled with this form of anesthesia, as the diet can be maintained up to the time of operation and immediately thereafter. In using this type of anesthesia, preoperative medication is given as for any type of local anesthesia. For amputations a narrow gum rubber tourniquet is applied to occlude the blood supply 3 inches above the proposed level of amputation; the authors have not found it necessary to apply ice to the extremity before placing the tourniquet in order to eliminate pain. A rubber sheet and blanket are placed under the extremity, which is then surrounded by cracked ice in a layer 3 inches deep, extending from the toes to a level 3 inches above the tourniquet; the rubber sheet and blanket are then drawn around the extremity "encased in ice." The minimum time of refrigeration for an amputation of the thigh is two hours; for a leg amputation, one and one-half hours; for amputation of lower leg, foot or toes, one hour. The authors note that for minor operations on the foot, such as incision and drainage or a local excision of a small tumor, refrigeration anesthesia has been employed without the tourniquet. The ice is not removed until the operating team is prepared for operation;

the authors have not found it necessary to use iced instruments. The tourniquet is released only when the major blood vessels have been secured and the stump is to be closed. Ice bags are not used postoperatively unless infection is present, when they "may be advantageous." The authors have not employed refrigeration anesthesia in the treatment of traumatic injuries, but believe that it would be of value in such cases. In the series of cases reported, the gross mortality was 38.8 per cent, but analysis shows that there were only 2 cases in which death could be attributed to the operative procedure, giving a corrected operative mortality of 11.1 per cent. One case of pulmonary embolism, the authors believe, might have been avoided by ligation of the femoral vein prior to amputation.

AMPUTATIONS BELOW THE KNEE IN OCCLUSIVE ARTERIAL DISEASE

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Proc. Staff Meetings Mayo Clinic, 18:361-67, Oct. 6, 1943

The authors present a study of the cases in which amputation was performed below the knee at the Mayo Clinic from January 1, 1930 to July 1, 1942, because of occlusive arterial disease. During this period 110 amputations were performed below the knee in 103 cases. Included in this group were cases in which the blood supply to the extremity had decreased permanently because of pathologic changes; namely, cases of thrombo-angiitis obliterans, arteriosclerosis obliterans with or without associated diabetes and acute arterial occlusion. Severe claudication and pain in the calf muscles are reasons for doubting the existence of adequate circulation below the knee. Various methods of determining the adequacy of circulation are mentioned, the most reliable to date at the Clinic appearing to be the "cut and see" procedure.

Amputations below the knee are not attempted in cases of operation for acute, spreading cellulitis or infection which does not respond to elevation, rest, chemotherapy and local heat. The risks of complication by infection are therefore minimal. When

primary healing fails, it is usually because of ischemic slough, and the success of secondary higher amputation is not endangered by primary closure of the stump below the knee. Persons requiring amputation for thrombo-angiitis obliterans are faced with the possibility of an amputation of the opposite limb, the level of which is undetermined. If a functioning knee can be secured after one of two amputations, this frequently means saving the patient's ability to earn his living. Therefore the knee should be spared if possible, even in the face of the chance of slow healing or reamputation. Also in arteriosclerosis obliterans the percentage of older persons who can use an artificial limb after amputation *below* the knee is sufficiently greater to justify this procedure. When amputation below the knee is done, a primary closure of the flap of the stump below the knee is done. A short anterior and a long posterior flap are cut without the aid of a tourniquet. The tibia is sectioned 5 to 6 inches below the knee, and the fibula about 1½ to 2 inches above this. The posterior muscle flap, consisting of the soleus and gastrocnemius muscles, is thinned down considerably and closed over the tibial end. All tissues are handled with care and the closure is fairly loose. Sulfanilamide crystals are dusted into the wound if infection is feared. A prophylactic dose of polyvalent gas and tetanus antitoxin is given immediately after operation. Oxygen is given in some cases through a B.L.B. mask for twenty minutes out of every hour for the first two or three days following operation, to increase the oxygen content of the blood which is to heal the tissues. In the case of ischemic sloughing, reamputation below or above the knee may be necessary. Only 3 deaths occurred in this series of 110 surgical procedures in 103 cases. Ninety of the 110 primary amputations below the knee were ultimately successful in obtaining a stump below the knee. Reamputation was necessitated in some cases by frank infection. When infection occurred, treatment consisted of opening the stump, application of moist dressings, culture and administration of suitable drugs. In gas gangrene, the wound was opened widely and a therapeutic dose of polyvalent gas gangrene antitoxin and roentgen therapy were given. If infection became rampant, amputation of the guillotine type was performed above the knee. Prostheses and late complications are discussed. 3 tables. 2 figures.

SULFATHIAZOLE IN CHRONIC OSTEOMYELITIS

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Surgery, 14:531-40, Oct. 1943

At the Lahey Clinic, the general plan of treatment of chronic osteomyelitis is as follows: The patient is given at least one week's bed rest at the hospital, during which time sulfathiazole is given by mouth in doses of 15 grains every four hours, i.e., 90 grains in twenty-four hours. The blood levels of the drug are determined, and blood counts and urinalyses made at frequent intervals. If the chemotherapy causes a reaction, sulfathiazole must be discontinued; recently sulfadiazine has been substituted for sulfathiazole in such cases. The routine operation in chronic osteomyelitis is wide saucerization of the infected bone. Where a sinus tract is present, methylene blue is injected into it before making the incision, as this is of aid in dissecting the sinus tract and tracing its entrance into the bone. In cases where a more complete study of the sinus tract is indicated, lipiodal is injected and roentgenograms made before operation. A tourniquet is used in the operation for chronic osteomyelitis, without spreading the infection. The dissection is carried down to the bone, removing granulation tissue, the sinus tract and as much scar tissue as possible, but leaving sufficient soft tissue to cover the bone in closing the wound. The cavity in the bone is opened with gouge and chisel, so as to create "outwardly sloping walls" as far as possible with "no overhang or re-entrant angles." A motor burr may be used in this saucerization of the bone. Any sequestra are removed, and the wound is carefully washed with saline to remove bone particles. Before closing the wound, the tourniquet is removed and hemostasis secured. Then sulfathiazole powder is placed in the wound, using 5 to 15 gm., according to the size of the wound and the conditions in each case. The wound is closed without drainage, additional sulfathiazole powder being "dusted into the wound" after each layer is closed; catgut is used for closing the deep layers of the wound, silk for the skin. A dry dressing is applied and a plaster cast to immobilize the joint above and below the affected area of bone. Sulfathiazole is continued by mouth for at least two

weeks after operation. The plaster cast is changed and the sutures removed two weeks after operation; the cast is kept on for four to eight weeks, depending upon the appearance of the wound. Thirteen illustrative cases are reported in which this method of treatment was employed. Healing took place promptly in 10 of these 13 cases; in 2 of the 3 cases in which healing was delayed, the full course of chemotherapy could not be given on account of intolerance to the drug. Saucerization was done in only 7 cases, 5 of which healed promptly; in the other cases, saucerization was not done because there was no gross evidence of bone infection, but actively draining sinuses (or in one case a soft tissue abscess). Sulfadiazine has not yet been used for oral administration in a sufficient number of cases to determine whether it is as effective as sulfathiazole against staphylococcal osteomyelitis; it should, however, be tried for patients who cannot tolerate sulfathiazole.

DIAPHYSECTOMY FOR CHRONIC OSTEOMYELITIS OF THE FIBULA

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Clinics, 2:1040-54, Dec. 1943

In the acute stage of osteomyelitis, adequate drainage of the infected bone and soft structures and general supportive treatment are the procedures of choice; resection is not indicated until the acute process has subsided. Resection of the shaft is not advocated in osteomyelitis of the tibia or femur, nor of the long bones of the upper extremity; but the fibula is not a weight-bearing bone and if it fails to generate after resection this is not of paramount importance. In resection of the shaft of the fibula the periosteum is split longitudinally and separated from the bone by a "fairly sharp elevator"; a sharp elevator is used on the theory that cortical cells are removed with the periosteum and aid in the process of regeneration. After removal of the shaft a long strip of rubber tissue drain is placed in the bed of the fibula, extending from one end to the other; and the edges of the periosteum are sutured over the drain with No. 1 chromic catgut, the drain pro-

trudes from the lower end of the incision. After closure of the fascia and skin, a large pressure dressing is used and a long leg splint. There is often some immediate postoperative reaction with pain and some elevation of temperature, but this soon subsides. The drain is gradually withdrawn, beginning on the third or fourth postoperative day. Weight bearing is allowed after the incision is healed and all pain and tenderness have subsided. Of 31 patients in whom this operation has been done, 15 were between two and ten years of age; and 12 between eleven and seventeen years of age; the oldest patient was forty-two years of age. When only a portion of the shaft of the bone was involved, the involved area with a section below and above it was removed; when a large portion of the shaft was involved, a subtotal resection was done, carefully protecting the proximal and distal epiphyses. A careful follow-up of patients for nine months to eight years after operation shows that the functional results were good in all but 3 cases; in one of these 3 patients infection of the ankle-joint developed postoperatively; there was no deformity of either the ankle or knee-joint in any of the younger patients. X-ray examination showed complete regeneration of the fibula in 13 cases; and considerable but incomplete regeneration in 8 others; 3 patients showed slight regeneration; 3 of the younger patients and the 4 adult patients show no regeneration of bone. There has been no recurrence of osteomyelitis in any case.

A STUDY OF SUBTROCHANTERIC OSTEOTOMY

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J. Bone & Joint Surg., 25:768-76, Oct. 1943

From an analysis of 100 consecutive cases of subtrochanteric osteotomy, the author presents the following recommendations: The ideal position in cases of fused hips is that of 25 degrees of flexion, neutral lateral position, and neutral rotation. Patients whose hips are fused in the above position have the best gaits. In cases where the shortening is more than 1½ inches, 5 to 10 degrees of abduction is recommended.

A high curved subtrochanteric osteotomy is recommended to correct deformities at the hip joint when operation on bone is indicated. Abduction, adduction, flexion and rotation can be readily corrected without sacrificing leg length. The position desired to produce a successful result can be obtained by attention to detail. When the osteotomy has been performed, the opposite hip should be flexed, flattening the lumbar spine. The extremity should be held in the desired position, with the aid of assistants if necessary, until the fragments are immobilized in plaster. The operator should use a goniometer if he is not satisfied with his clinical estimate of position.

The difficulty of immobilizing the pelvis is recognized. A snugly fitting double plaster-of-paris spica extending well above the nipples, is necessary. The opposite hip should be in abduction. When a subtrochanteric osteotomy is done in the presence of a mobile hip, the use of the Roger Anderson pin apparatus or skeletal traction may be of assistance to the operator in controlling the fragments. The Roger Anderson apparatus should not be used unless the operator is trained in the technique and is aware of the attendant dangers. 13 references. 6 tables. 1 figure.

INTERNAL DERANGEMENTS OF THE KNEE JOINT

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J. M. A. Alabama, 13:167-70, Nov. 1943

The series of knee arthrotomies for derangements of the knee joint here presented includes 648 cases. Of these about 70 per cent were medial cartilage injuries; lateral cartilage injuries 6 per cent; fractures into the knee joint, 8 per cent; arthritis and synovitis, 5 per cent; joint mice, 6 per cent; tuberculosis of the joint, 2 per cent; and tumors of the knee joint, 3 per cent. Following a discussion of anatomical considerations the author proceeds to discuss diagnosis and differential diagnosis. Occasionally one sees a calcified meniscus on x-ray, but therapy should be directed only toward treatment of symptoms. Ordinarily the carti-

lage is removed through a small antero-medial or antero-lateral incision. The tourniquet is not employed routinely. The curved Freiberg or Lowe-Breck cartilage knife facilitates removal of the meniscus. Postoperatively it is important to begin early motion and muscle setting exercises to develop the quadriceps. The patient is allowed up as soon as he is free from pain.

Cruciate ligament tears are commonly seen at operation, but, if the joint is stable, are best left alone. Where instability is present, repair is undertaken, employing a fascial strip to limit forward sliding of the tibia.

In synovitis and arthritis, conservative therapy, correction of obesity, allergy or focal infection plus the specific drugs, as sulfonamides and sulphur, may be tried. If conservative treatment fails, a radical synovectomy is indicated in selected cases but is not too promising of a permanent cure. The tuberculous knee is best treated by fusion. In gonorrheal and luetic arthritis specific conservative therapy is best. The pyogenic joint may require drainage and continuous irrigation to prevent destruction of the articular cartilages.

For tumors of the synovia, bone, fat pad or capsular structures, excision and x-ray therapy are employed. In giant cell tumor reconstruction of the tibia or femur is often possible, but the local invasive growth of the giant cell tumor or xanthoma often necessitates amputation.

Derangements may result from fractures of the tibia or femur extending into the joint. Tibial condylar fractures most commonly result in a depression of the tibial plateau necessary for weight bearing. If the weight-bearing plane is altered, then elevation of the depressed plateau may be necessary by inserting a wedge of bone under the condyle, or performing an osteotomy with realignment of the joint plane. The disability and symptoms should be a guide to surgery and not the x-ray in an endeavor to obtain anatomic restoration. The disability is prolonged and weight bearing is not permitted for about 6 months. After operation conservative treatment must be continued, especially physiotherapy with gradual exercises and stretching, weight reduction, shoe correction and support. The author does not routinely use preoperative sterile wrapping of the extremity nor sulfathiazole in

the wound. No tourniquet is used and hemostasis is obtained before the wound is closed, thereby lessening postoperative effusion. Compression dressings are not applied postoperatively. Motion and weight bearing is allowed as soon as the wound heals and comfort permits, except in fractures. Good results are expected in all except the degenerative derangements, and even in these arthritic patients some improvement may be promised. 6 references. Discussion by Dr. W. C. Hannon (Mobile).

RECENT ADVANCES IN THE TREATMENT OF RUPTURED (LUMBAR) INTERVERTEBRAL DISKS

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J. M. A. Alabama, 13:129-31, Oct. 1943

During the past three or four years the diagnosis and treatment of ruptured lumbar intervertebral disks have been revolutionized. The diagnosis can now be made solely upon the history of low back pain plus sciatica down the back of the leg and occurring in attacks; nearly always the backache and pain in the leg are intensified by coughing and sneezing during the acute stage of pain. In 95 per cent of cases with such symptoms a ruptured disk will be the cause. In the other 5 per cent three other conditions have to be differentiated, namely: spondylolisthesis (2 per cent), congenitally defective fifth lumbar vertebra (2 per cent), and tumors of the cauda equina (1 per cent). An x-ray of the lumbar spine will diagnose or eliminate the first two. In tumors of the cauda equina the pain may be higher up in the back and there is frequently loss or diminution of the patellar reflex. Should a tumor be present, a lumbar puncture will show xanthochromic fluid. Only the suspicion of a tumor justifies a lumbar puncture. Positive evidence of a disk is frequently indicated in the lateral view of the x-ray by narrowing of an intervertebral space. The Achilles reflex is normal in over half the cases, but when reduced or absent, the disk is usually at the fifth lumbar. It is, therefore, important only for localization of the disk. The

author proceeds to discuss the types of disks, contraindications for spinal injections of lipiodol or air, the localization of disks and treatment. To date 506 disks have been operated upon. The last 300 disks have been thoroughly curetted. Recurrences in the entire series were only 25, or 5 per cent. Excluding the thoroughly curetted joints, the recurrences would have been 14 per cent.

The author concludes that spontaneous cure is very rare, although temporary remissions are the rule. The two components of a ruptured disk are the necrotic interior of the disk causing backache and the protruding portion causing sciatica. Diagnosis is made solely by signs and symptoms and x-rays of the spine. All disks can be diagnosed correctly and found at operation. Spinal injections of contrast media and spinal punctures are contraindicated. The small (concealed) disks outnumber the markedly protruding ones two to one. These do not show with spinal injections of contrast media. Two disks in the same patient occur in about 80 per cent of patients, and occasionally there is a third disk.

In the operative treatment of ruptured disk the exposure is unilateral and between the laminae without removal of any bone whatever (Love's operation). If the interlaminal opening is too small, the removal of a small bite of lamina may be necessary. Motility of the vertebra tested by pressure on the spinous process will usually determine whether the disk is at the fourth or fifth lumbar, or both. The entire necrotic content of the interior of the disk should be thoroughly removed with curettes. This is the best insurance against recurrence. Fusion operations are unnecessary and contraindicated. Fusion of the vertebrae occurs after removing the necrotic contents of the disk.

Surgery of the Thyroid

SURGERY OF THE THYROID

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J. M. A. Georgia, 32:355-59, Nov. 1943

This paper deals with preoperative and postoperative treatment of patients subjected to surgery of the thyroid gland. The cooperation of a competent internist is important. In preoperative treatment, patients may be classified into two groups, the nontoxic or mildly toxic group and the more seriously ill, toxic group. Very little preoperative treatment is usually necessary in patients of the first group. They require a few days of rest in bed with mild sedation and laxatives, and increased liquids for a few days prior to operation. In the toxic group, a very definite schedule of preoperative treatment is indicated. The patient should be placed at absolute rest in bed in the hospital in the quietest room available. Very few visitors should be permitted and only for very brief visits. Kindness, patience and tact must be used to gain the patient's confidence. A complete hospital work-up, including basal metabolic rate determination, should be completed. Mild hypnotics may be given to allay nervousness. The diet should be very liberal, containing at least 4,000 to 5,000 calories with a high carbohydrate content and rich in vitamins A, B and D. At least 5 liters of fluid should be taken in twenty-four hours, and if necessary should be given by hypodermoclysis or intravenous infusion. Nembutal or sodium amytal may be given in quantities sufficient to allay nervous irritability. Lugol's solution, 15 minim doses three times daily by mouth are then administered, but only after the patient has consented to operation and this is definitely planned. The cardiac status of every patient must be noted, and where indicated digitalization should be instituted from the beginning. If edema is present, the fluids should be limited. In some cases of fibrillation or flutter, quinidine sulfate in 4 to 6 grain doses three times daily is indicated. Operation should never be performed until the cardiac reserve has been restored as far as possible.

The time of operation must be decided by the surgeon and internist together. The author prefers to see the pulse below 90, the weight at least stationary or gaining, nervousness allayed, and signs of general improvement. The basal metabolic rate should be lowered. If the gland is hard, it may soften if sufficient time is allowed, thus rendering operation easier. Operation must not be delayed too long, but should be performed when maximum improvement from the treatment described above and Lugol's solution has been attained. The day before operation, the patient is given hypnotic drugs to insure a good night's sleep. In the morning all food is omitted. Three grains of sodium amytal are given by mouth two hours before operation and ¼ grain of morphine and 1/150 grain of atropine one hour before operation by hypodermic. Personally the author prefers local infiltration anesthesia using 1 per cent novocaine solution. Cleanliness of the operative field and absolute hemostasis are of prime importance. Resection of the gland should always be limited to the confines of the capsule. In this way one may avoid injury to nerves or parathyroid bodies. It is also of great importance to remove enough gland.

Immediately after operation, the patient is given sufficient morphine to control pain and restlessness. The patient is placed in bed in a half sitting position with a well-trained nurse in attendance. The patient is given 1,000 cc. of 10 per cent glucose intravenously immediately, and later 1,000 cc. of 3 per cent glucose subcutaneously. Five cc. of Lugol's solution in tap water should be given by rectum as a retention enema. As early as possible the patient is placed on a liquid diet and given 15 minim doses of Lugol's solution three times daily by mouth. Morphine sulfate should be given in adequate doses to insure rest. No company is allowed.

As rapidly as possible, the patients are placed on the same schedule of therapy that they had before operation. The wound is treated as any other surgical wound. As improvement is noted the Lugol's solution is decreased in amount and the patient is allowed out of bed as soon as possible to regain strength. If toxic crisis threatens or develops, morphine is given at once to insure rest. Twenty per cent dextrose is administered intravenously and the patient is placed under an oxygen tent. Where the tem-

perature is moderately elevated sponge baths are beneficial. In more severe cases ice packs may be required to reduce the temperature. Whole blood transfusions or plasma infusions may be of value if there is evidence of collapse. Iodine therapy is adequate and if not, sodium iodide should be given intravenously. Hemorrhage and shock are treated as in any other disease. In cases of bronchial obstruction with collapse of the lung on that side, bronchoscopic removal of the mucus plug offers best chances for recovery. In collapse of the trachea, tracheotomy is indicated at once. For tetany developing after operation, the patient should be given calcium and parathormone intravenously. The patient must be watched for months and years after thyroid surgery. Where there is a tendency to malignancy, radiation is indicated over the anterior neck, sternum, lateral and posterior cervical areas. 7 references. Discussion by Dr. C. H. Watt (Thomasville), Dr. Ralph H. Chaney (Augusta).

A METHOD OF INTRAVENOUS IODINE MEDICATION FOR THE RAPID PREPARATION OF PATIENTS WITH DIFFUSE TOXIC GOITER FOR OPERATION

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North Carolina M.J., 4:439, Oct. 1943

Once in a desperate attempt to save a patient in a thyroid crisis following operation, the author gave the patient 100 drops of Lugol's solution in 500 cc. of salt solution, and repeated the dose. Within two hours she had improved, and by next morning delirium had subsided, the temperature was down, and the pulse was slower. Since that time the author has used the following method of preparing patients with diffuse thyrotoxemia for operation. Toxic nodular goiters can also be prepared but their response is not so prompt as that of diffuse thyrotoxic cases.

The patient is kept at absolute rest in the hospital, with sedation and a high caloric diet. A daily intravenous injection of 500 to 1,000 cc. of 10 per cent glucose with 100 to 150 drops of Lugol's solution or organidin is given. The metabolic rate decreases

rapidly and the patient is usually ready for operation within a week. The operation must not be performed of course without due consideration for the usual laboratory procedures: the hippuric acid test of liver function, the cholesterol content of the blood, galactose tolerance determinations, and basal metabolic rates. It is rare that a patient so treated for five days, who can hold his breath for three-fourths of a minute, cannot tolerate a thyroidectomy. The same treatment is continued for two or three days following the operation.

Traumatic and Industrial Surgery

INTRAVENOUS NOVOCAINE FOR ANALGESIA IN BURNS

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Canad. M. A. J., 49:478-81, Dec. 1943

That dilute solutions of novocaine may be safely given intravenously has been repeatedly demonstrated. The author has employed intravenous infusion of novocaine to obtain analgesia during the dressing of burns. In the first 3 cases in which this method was used a 0.1 per cent solution of novocaine in normal saline was employed; in other cases a 0.2 per cent solution in a saline solution containing 5 to 10 per cent glucose was employed. In the cases in which the infusion was not begun until after the patient complained of pain due to dressing of the burn, the pain was relieved within a few minutes after starting the infusion of novocaine. In other cases in which the infusion was begun before dressing the burn, patients did not complain of pain although in several instances thorough cleansing and scrubbing of the burned area was necessary. A total dosage of from 0.6 to 1 grm. of novocaine was given in these cases without any untoward effect.

THE SULFANILAMIDE OINTMENT TREATMENT OF SEVERE BURNS

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Surg., Gynec. & Obst., 77:367-75, Oct. 1943

The sulfanilamide ointment employed by the authors in the treatment of severe burns is made of equal parts of sterile lanolin and cold cream to which sterile sulfanilamide powder is added "by thorough dispersion," 6 per cent by weight. In previous experiments the authors found that the application of sulfanilamide

to extensive burns in a water-dispersible base resulted in "dangerously high blood levels" of the drug. In the treatment of burned patients, careful aseptic technique is observed; all attendants and the patient are masked "to prevent air-borne infection"; the patient is given morphine in adequate doses to relieve pain (¼ grain for adults); recently sodium luminal has also been given. When pain is relieved, the burned areas are "gently washed" with white soap and sterile saline; blebs are opened and "dead" skin is removed. A "liberal quantity" of the sulfanilamide ointment is then applied to all burned areas with a tongue blade; surgical compresses are placed over the ointment with individualization of fingers in burns of the hand. Then pressure dressings are applied except to burns of the face. Various types of pressure dressings have been used, but the authors consider the regular "leg" roll best for general use; the amount of pressure employed is such as to avoid the danger of nerve injury. Since it has been found that the edema of facial burns subsides by the fourth day without pressure dressings, their use in this type of burn has been omitted. This method has been employed in a series of 126 patients, all of whom were admitted to the hospital within an hour after the burn was sustained. Plasma was given early in amounts of 250 to 500 cc. in the first twenty-four to thirty-six hours unless the patient was in shock and required larger doses. Hematocrit readings were made frequently and the attempt made to keep the hematocrit levels at 50 to 52 in the first two days, but not to restore plasma volume fully before forty to seventy hours after the burn was received. This has resulted in a definite saving of plasma, and only 4 of these patients developed shock, including one who had a 75 per cent burn and was given large amounts of plasma. The authors are of the opinion that the early application of pressure dressings in this series diminished the incidence of shock. Only a few of the severely burned patients showed any signs of toxemia in the first three to five days. Three patients developed a sulfanilamide rash which disappeared promptly when sterile vaseline was substituted for the sulfanilamide ointment. With the sulfanilamide ointment and pressure dressings, the average superficial second-degree burn had healed when the first dressing was removed on the seventh to ninth day. The deep second-degree burns usually re-

quired another dressing but healed in fourteen to eighteen days. Small third-degree burns often showed healthy granulation tissue in fourteen days, but extensive third-degree burns required a longer period before skin grafting could be begun. There was no evidence, however, that the sulfanilamide ointment delayed healing in these cases. Excellent results were obtained in burns of the hands and face. The authors are of the opinion that the sulfanilamide ointment with occlusive dressings could be used as a "primary emergency dressing" in military practice until the patient could be removed to a base hospital for further treatment.

USE OF PRESSURE DRESSINGS IN THE TREATMENT OF BURNS AND OTHER WOUNDS

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S. Clin. North America, 23:1354-66, Oct. 1943

In the local treatment of burns a strict aseptic technique is essential as in a major surgical operation; all the personnel should be gowned and masked and wear sterile gloves. The patient is given sufficient morphine (usually ½ grain) to obtain analgesia. All the patient's clothing should be removed with as little trauma as possible. The burned areas are "gently washed" (not scrubbed) using large pads of absorbent cotton (sterilized) dipped in thick suds made with sterile water and neutral white soap; this cleansing is continued for ten minutes. Then all vesicles that have persisted are opened and drained, loose skin and "pedicles" from the vesicles are removed by sharp dissection, and the burned area is gently rinsed with warm saline solution. These procedures, if adequately carried out, convert the burn into a "surgically clean wound," to which the pressure dressing is applied to close the wound. The first layer in the pressure dressing is a single layer of fine mesh gauze moistened with normal saline solution; the author does not use "any greasy substance" as he considers that this interferes with drainage. The next layer of the dressing is made of coarse meshed dry gauze, ½ to ¾ inch thick. These two layers are then "wrapped

snugly." A layer of sterile fluffed mechanic's waste, about 6 inches thick, is then "placed around the entire area to be enclosed in the dressing," and firmly fastened by bandaging. In applying this bandage, firm pressure is exerted so as to reduce the thickness of the layer of mechanic's waste from 6 to approximately 3½ inches; owing to the "fluffiness" of the waste, "even and equal distribution of pressure" to the underlying tissues results. One layer of waterproof cellophane is applied over the entire dressing so as to allow "an overlap" of the pressure dressing at each end; this is fixed with another bandage and a final layer of 3-inch adhesive strips; this final layer furnishes additional pressure. Dressings are not changed for eighteen to twenty days; during this time, it has been found that patients are "surprisingly comfortable"; the pain and distress of frequent changes of dressings are avoided. When dressings are changed, this is done in the operating room and under aseptic precautions. In cases with complete skin loss, in which skin grafting is necessary, the grafting can often be begun when the first dressing is removed. In cases of burns in which infection has developed at the time of the first dressing, the same method of pressure dressing is employed, but a formed dressing that can be applied as a single unit is employed, and Dakin's tubes are incorporated in this dressing. The ends of these tubes which extend beyond the dressing are connected to a glass tube with multiple outlets, and this, in turn, to a rubber tube attached to an infusion bottle, establishing a closed system of irrigation. The burned area is irrigated with sterile normal saline or 2 per cent boric acid solution, until the patient notes "a sensation of moisture," usually requiring 25 to 50 cc. in large dressings. This is repeated three or four times a day except in extremely hot weather. These dressings should be changed every three or four days with strictly aseptic technique. In the author's experience, this method of treating burns has reduced the complications due to infection and shortened the period of hospitalization.

BURNS

RALPH T. RICHARDS
Salt Lake City, Utah
Rocky Mountain M.J., 40:810-15, Dec. 1943

For the relief of pain in severely burned patients, morphine is indicated, but overdosage should be avoided. The Massachusetts General Hospital group advocate the intravenous administration of morphine; 1/6 grain repeated every fifteen minutes until the pain is relieved or three doses have been given; the author considers this to be "conservative medication," which avoids depression of the respiratory center and increase of anoxia. When a burned patient is admitted to the hospital in shock, blood specimens should be taken for laboratory determinations as a guide to administration of plasma. However, if the clinical findings indicate that shock is present or impending, plasma should be given intravenously at once, "in amounts indicated by the extent of the burn." The subsequent administration of plasma can be guided by frequent hematocrit readings, but the author believes that in such cases "prompt action" is necessary to prevent irreversible damage that may result from prolonged blood concentration and tissue anoxia.

There are a number of methods for the local treatment of burns that give excellent results, among them Koch and Mason's boric acid ointment and pressure dressings, Sherman's paraffin method, triple dye, tannic acid and silver nitrate. Some of these methods require complicated equipment and trained personnel. The author has used a relatively simple method for the treatment of burns since 1925 with good results. It consists in the application to the burned surface of a solution three and a half parts of tannic acid (by volume), one part of grain alcohol (by volume). Thus, if 4 ounces of the solution are needed, 14 ounces of the tannic acid powder are placed in a graduated container and 4 ounces of alcohol poured into it; the container is gently rotated and the solution forms "a dark, thin syrup," which is ready for use. Fresh burns are not cleansed, as the direct application of the tannic acid alcohol solution has a sufficient antiseptic effect to prevent infection. The solution is spread over the entire burned area with

a pledget of soft cotton held in a forceps. The application causes "a sharp, stinging pain," which, however, subsides "within a minute," leaving the patient "comfortable." The solution quickly forms a film over the burn but about twenty minutes is allowed for it to dry before applying a sterile dressing. The dressing does not have to be changed for three or four days, unless there is "considerable weeping" from the burn. The author does not break or cut away blebs on the burned surface as a rule, unless they occur on the palms of the hands or the soles of the feet, where the epidermis is thick and prevents expansion; then only a small puncture is made near the periphery of each bleb to permit escape of the fluid. With this method of applying the solution promptly as an initial dressing, the author has never seen an infection of clinical significance develop in a burn. The eschar formed is thin and usually pliable; it is not disturbed when dressings are changed; if a piece of gauze adheres to the eschar it is cut away and left in place as part of the eschar. When the eschar separates, it leaves a granulating surface. After separation of the eschar, the author uses flamed oxide plaster cut in strips, applied along the edges of the granulations and "cross hatched" over the exposed area; a dressing similar to that used by Boynton of Bristol a hundred and forty years ago. Dressings are changed every three or four days; the adhesive strips separate readily; the area is dried with sterile gauze and fresh strips applied. With this method, it has been found that epithelial growth is rapid, and plastic surgery is rendered unnecessary as a rule.

BURNS TREATED WITH VIACUTAN, WITH SPECIAL REFERENCE TO THE FACE AND HANDS

FRANK PICK and DONALD BARTON

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Lancet, 2:408-10, Oct. 2, 1943

Viacutan is silver dinaphthylmethane disulphonate in a 1 per cent solution, adjusted to a pH of 4.5; the solution remains stable if kept away from "strong light," and shows a slight brown fluo-

rescence. Before the application of viacutan the burned area is cleansed with warm normal saline solution, blisters are cut away, and the area again "washed" with normal saline and dried. The viacutan is "painted" on the entire burned area and the surrounding normal skin. Large burns are dressed under intravenous pentothal sodium anesthesia in adults and under light ethyl chloride and ether anesthesia in children; with small burns, morphine was found to be sufficient to relieve pain. Patients treated in the hospital are kept under "a heat cage" after the application of viacutan, and another application made six to twelve hours later. If moist areas are present at any time, more viacutan is used, or a sterile powder may be used, such as zinc oxide and starch or sulfanilamide. For patients not requiring hospital treatment, the viacutan is applied on a single layer of gauze mesh, allowing it to dry before bandaging; as a rule the gauze can be removed in twenty-four to forty-eight hours without disturbing the coagulum; if not, it is allowed to remain. In using viacutan in more than 80 cases, including many burns of the hands and face, the authors have found that it is definitely bactericidal and bacteriostatic and prevents the development of infection; the coagulum usually separates in eight to twelve days and epithelization is rapid; skin grafting was not required even in third degree burns. Pain is rapidly relieved by the viacutan dressing; there is little edema or immobilization of the affected part, so that viacutan can be safely used for burns of the hands or face without causing scarring or disability. Viacutan is suitable for either "first aid" or hospital treatment.

TREATMENT OF BURNS WITH A TRIPLE-DYE-SOAP MIXTURE

C. Neville Robinson (Captain, R.A.M.C.)

Lancet, 2:351-53, Sept. 18, 1943

The ideal coagulum for the treatment of burns must be durable, pliable and non-contractile, non-toxic, non-irritant and bactericidal. Experiments with various materials have shown that

mixtures of soft soap and egg albumin, blood and soap, and triple dye and soft soap fulfill these criteria. The mixture containing egg albumin is not at present practicable for use. The blood and soft-soap mixture (equal parts of blood and soft soap) has been used in only 5 cases, but gave good results even in infected cases. The triple-dye and soap mixture has been used in 106 cases of burns, including burns of the hands and face. The soap used was sapo mollis B P (potassium oleate); it is mixed with three parts of water and sterilized by boiling; equal parts of this soap solution and triple dye (gentian violet 4 per cent, brilliant green 1 per cent, and acriflavine 1 per cent) are then mixed together. In recent burns this mixture is applied with strict asepsis, without irrigation of the burned area. The mixture is sprayed on with a de Vilbis spray, covering an area at least one inch beyond "the obvious periphery" of the burn. Blisters are not broken but the mixture is "injected" into them with a hypodermic syringe and fine needle. The coagulum is dried by exposure to air or a hair dryer. The patient is directed to move the burned parts, and if any cracks occur in the coagulum, they are sprayed immediately. Burned limbs are suspended after application of the coagulum with care not to exert pressure on the burned area. Burns that are not treated promptly and become infected are irrigated with physiological saline (but not swabbed) before the triple-dye, soft-soap mixture is applied. In the 106 cases treated by this method, the burn was clean in only 15 cases; of the 91 infected cases, 41 were febrile. Most of the burns were of the second degree; small areas of third degree burns were present in a few cases. There were no deaths in this series, and skin grafting was not required; scarring was minimal; all patients had full movements of digits, limbs and eyelids, with no contractures. The average number of days required for healing in the infected cases ranged from seventeen days for burns of the face to thirty-five and a half days for extensive burns.

A NEW TYPE OF BONE PLATE AND SCREWS

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Los Angeles, Calif.

Surg., Gynec. & Obst., 77:595-97, Dec. 1943

A plate has been devised for the treatment of fractures which is made of austinitic (18-8) stainless steel; the plate used for fractures of the femur and other large bones is 20 cm. long and 1.4 cm. wide; oval slots 1 cm. long are placed 1 cm. apart to serve as screw holes. The stainless steel is strong but ductile, so that it can be molded to the contour of the bone without danger of breaking. The length of the plate permits bridging of all single and many double fractures; the plate can be cut to the desired length when the fracture site is exposed, because of its light gauge. The plate is corrugated, and this adds to the strength of the metal and allows two or more plates to be "stacked" or "laminated" one on the other; with the alternate ridges the thickness is increased only by the gauge of the metal itself, 0.07 cm. The corrugated structure also permits lengthwise "staggering" of the plates. The oval slot holes have been found to be of definite advantage in obtaining accurate approximation of the fragments without "the extreme accuracy" in drilling the holes in the bone required by the usual round counter-sunk screw holes. For fractures of the femur the use of two or more plates is recommended (two plates for single fractures) with six screws for fixation; for fractures of the tibia, one plate with four to six screws has been found to be sufficient. Smaller plates of the same design have been employed for the bones of the forearm. The screws are 6-20 stainless steel of the tuk-tap type, with a sharp point off center, and twenty threads to the inch. The off center point facilitates the passage of the screw through the bone with less force, so that a smaller drill (No. 36) can be used than with the old type screws. The holding power of these screws has been found to be superior to that of the Sherman screw. With the smaller plates a 4-24 stainless steel screw is used. The plates and screws described have been used in the treatment of more than 70 fractures at the Los Angeles General Hospital.

CONTRIBUTION TO THE TREATMENT OF FRACTURES

(*Contribution au traitement des fractures*)

D. G. CHESSEX

Montreux

Helvetica med. act., 10:395-402, June 1943

In a consideration of possible improvements in the operative treatment of fractures, the author emphasizes the following points: (1) Whenever possible prepare the patient (respiratory exercises, effleurage, fumigations) and the operative field for at least two days before operation. (2) Whenever possible use local anesthesia in preference to general anesthesia, especially in fractures of the hip. It is sometimes useful to administer an injection or two of eukodalskop (small dose) one hour before operation. (3) If possible, the patient should be operated upon in his bed to avoid mobilizations and transportations after operation. (4) Do not operate upon diaphysial fractures (femur, tibia, fractures of the forearm) until after fixation by double extension or bipolar traction. The surgeon then applies gentle traction, very progressive, with movements of rotation to correct axial deviations. Only following such correction is the actual fracture exposed. The coaptation obtained by reduction and fixation is not necessarily mathematically or anatomically exact. It is important that the fragments be kept in contact. In joint fractures a more rigidly exact approximation is necessary to insure function of the joint. Once the operation is finished the weights on the extension and counter-extension should be diminished beginning as early as the first day and this diminution should be progressive until consolidation is complete.

In all diaphysial fractures a treatment with massage and tapotement in the axis of the fracture is applied regularly from the fifteenth or twentieth day. This treatment is well tolerated and painless if the contact of the fragments is good. Osteogenesis appears to be accelerated by this daily pressure. The wires were at first purposely permitted to extend 1 to 2 cm. beyond the surface of the skin, so as to facilitate their removal, on the twentieth or fortieth day under radiologic control. This practice has now been abandoned as it is believed better to bury the wires. Three illustrative cases are briefly described. 13 figures.

TEN FACTORS IN THE CLOSED PLASTER TECHNIQUE FOR COMPOUND FRACTURES OF LOWER EXTREMITIES

E. T. RUMBLE (Lieutenant, M.C.-V. (S), U.S.N.R.) and
J. A. MILLSPAUGH (Lieut. Commander, M.C., U.S.N.)

Mil. Surgeon, 93:448-49, Dec. 1943

Compound comminuted fractures were treated on a Navy ship by the closed plaster technique. The following ten factors were found to be of value in the application of this treatment:

(1) All operative procedures were delayed until the patient was out of shock and blood pressure had remained at 110/65 for at least three hours.

(2) At least 1,000 cc. of compatible blood for transfusion was available for each case before debridement.

(3) Prophylactic doses of gas gangrene antitoxin were given early but not while the patient was in shock.

(4) Every wound was debrided under open ether anesthesia as rapidly as possible, removing "obvious, accessible foreign bodies," necrotic muscle tissue and loose bone with necrotic marrow but avoiding injury to major arteries and nerves.

(5) Amputation was not done unless loss of arterial blood supply was "very obvious."

(6) Sulfathiazole was applied locally, 5 to 10 gm. in each wound, but not more than 15 gm. in any one patient if wounds were multiple.

(7) Wounds were packed with vaseline gauze, getting the packing into the depth of the wound.

(8) Unilateral hip spica was used for fractures involving the femur; the rotation was corrected, the shortening reduced, and the thigh immobilized to give 60 degrees of flexion on the abdomen, wooden pieces were used to reinforce the plaster "laterally across the hip joint" and keep the spica from cracking.

(9) If the cast became loose after three weeks, owing to absorption of discharges, a new cast was applied under general anesthesia. In cases of fracture of the femur, the secondary cast was a bilateral hip spica, as immobilization of the thigh on the unaffected side was

found to furnish the best immobilization of the hip joint involved.

(10) Postoperative oral medication was given as follows: Sulfathiazole, 1 gm. every four hours day and night for seven days, then gradually reducing dosage for the next two weeks; standardized multiple vitamin preparations each morning; ferrous sulfate 0.6 gm. three times daily after meals; and calcium lactate three times daily with meals. None of the men with compound comminuted fractures treated by this method died; there were very few toxic reactions or complications of any kind; the patients were comfortable and required little nursing care.

TEMPORARY PERCUTANEOUS WIRE FIXATION FOR OPEN FRACTURES (*Temporäre perkutane Drahtfixation bei offenen Frakturen*)

F. Becker

Helvetica med. act., 10:387-90, June 1943

Although temporary percutaneous wire fixation has been recommended by several writers, it has not become popular, probably owing to certain difficulties in technic and the fear of infection. The opinions as to the advantages and disadvantages of operative treatment of open fractures are divided. Häbler states that osteosynthesis does not lead to pseudarthrosis and is therefore to be recommended. Imbert warns against the danger of progressive osteomyelitis and delayed consolidation in osteosynthesis. Recently Talkenberg reported that in a series of 107 cases of open fractures only 30 per cent had a smooth recovery, and that severe infection was 2½ times as frequent as following conservative treatment. Pseudarthroses occurred 10 times as frequently and in 60 per cent of cases the Lane plates had to be removed owing to suppuration, pain or loosening. For this reason the present writer prefers to use temporary percutaneous wire fixation in open oblique fractures. The wire is inserted while the fracture is exposed so that the position of the fragments of the wire and results of fixation can be controlled. As the wire is inserted the fragments are approximated and fixed with bone grasping forceps so that no

displacement by the wire is possible. After a few weeks the wire can be removed without difficulty, so that an injurious foreign body action is excluded. The theory that this method is permissible only in absolutely aseptic cases does not seem tenable to the author. He believes that infection is much more efficiently combated by firm fixation, and would be far easier disseminated along an open medullary cavity than along the wire firmly fixed in the cortex. Then, too, the wire can be easily removed at any time if danger is suspected. The fear of infection can likewise be allayed by the use of modern chemotherapy. In both of the cases described, Cibazol was used. The method should prove useful also in open torsion fractures and in many atypical fractures. 8 references. 4 figures.

SOFT TISSUE INJURY COINCIDENT WITH FRACTURES

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Philadelphia, Pa.

Pennsylvania M.J., 47:33-38, Oct. 1943

The authors wish to correct the impression that a fracture means primarily the solution of continuity of bone, and secondarily, injury to the soft tissues, emphasizing the fact that the two are of equal importance; in fact, not infrequently, the injury to the soft tissues is far more serious than is the injury to the bone. By early recognition of a fracture, one may minimize the danger of aggravating soft tissue damage during reduction. A fracture should be reduced as soon after injury as the condition of the patient will permit, after preliminary treatment for shock, if necessary. The method of treatment of fractures must always be strongly individualized. Gentle manipulation is urged, as associated with the fracture there may be a hematoma, laceration or maceration of muscle and fascia, or injury to nerve and blood vessels. Immediate application of splints at the site of accident will minimize the injury to the soft tissues coincident with fracture. Blitz victims in England are at once rushed to a hospital. But this should not be the method of treatment of fractures in civil life. It is better to await

the arrival of a Keller-Blake or a Murray-Jones splint than to remove a patient with the application of an improvised splint. A first-aid assistant should be able to apply these splints. The necessity for proper training of first aid assistants is stressed, if they are not to do more harm than good. The Murray-Jones splint is recommended for fractures of the upper extremity and a Keller-Blake splint for fractures of the femur, or of both bones of the lower leg, prior to transportation of the patient. At the time of reduction, the surgeon should have facilities available for proper fixation of the fragments. Prior to and subsequent to reduction of a fracture, the attending surgeon should examine the patient for possible soft tissue injury to nerve trunks, peripheral nerves and blood vessels. Multiple reductions add to the injury of the soft tissues. Not infrequently a perfect alignment is unnecessary. Slight overlapping will give a perfectly satisfactory functional result, lessen the convalescence of the patient and minimize the danger of delayed and non-union. Faulty types of immobilization of the fracture may cause injury to the soft tissues. An attempt should be made to maintain the function of the soft parts as well as to obtain satisfactory reduction. The hanging plaster of paris case in treatment of fractures of the shaft of the humerus has in selected cases given excellent results. 5 references. Discussion by J. Huber Wagner, of Pittsburgh. 2 figures.

FEMORAL PLATING WITH FIXATION BY THE TOWNSEND AND GILFILLAN PLATE

E. L. MacPherson (Commander, M.C., U.S.N.)

S. Clin. North America, 23:1623-26, Dec. 1943

Prior to 1941, the author treated all fractures of the femur by skeletel traction or by the Roger Anderson fixation method. Good results were obtained by these procedures in the simpler types of fractures, but fractures with marked comminution or interposition of muscle required open reduction and pin traction. More recently the author used the Townsend and Gilfillan plate in the treatment of fractures of the femur that are not easily reduced by

skeletel traction. Skeletel traction is used in all fractures of the femur with a Kirschner wire through the distal end of the femur and balanced traction on the foot and leg. This renders the patient comfortable and reduces shock; some of the simpler fractures are successfully reduced by this method, and traction is then continued. If the fracture is not reduced after seven days, the Townsend and Gilfillan plates are used, with two plates "nested" together to give additional strength. Accurate placement of the plates and angulation of and securing of the screws is a mechanical problem. The procedure is aided by fixation of large comminuted fragments by a separate screw placed away from the site of the plating. No external fixation is used, and the patient is encouraged to exercise the muscles of the leg; but is kept at rest in bed for four weeks and then uses crutches until x-ray examination shows callus formation. All of the cases treated by this method showed early union without muscle atrophy or limitation of motion of the knee joint; the period of disability was reduced by 50 per cent.

FRACTURES OF THE RIB CAGE FOLLOWING INTERSTITIAL RADIUM THERAPY FOR CANCER OF THE BREAST

HOKE WAMMOCK and ROBERT K. ARBUCKLE

Jeanes Hospital, Philadelphia, Pa.

Am. J. Roentgenol., 50:609-15, Nov. 1943

The authors present 10 patients who were treated with gamma radiation for cancer of the breast and who subsequently developed fractures of the ribs. There was no clinical evidence of local or metastatic disease. In most instances, the fractures appeared in less than two years. Formerly roentgenograms of the chest were not made routinely in absence of symptoms, and consequently many fractures were doubtless present long before their discovery. In one case a fracture was detected as early as eleven months after treatment. Traumatic fracture and neoplastic invasion could be ruled out and the authors feel justified in considering these rib

changes as due to a non-neoplastic post-gamma irradiation effect. They believe this effect is brought about by an interference with the blood supply of the ribs. It is therefore evident that adult bone is not resistant to therapeutic irradiation directed to a nearby neoplasm. 16 references. 9 figures. 1 table.

NEGLECTED FEMORAL FRACTURES

LEONARD T. PETERSON (Colonel, M.C., U.S.A.)

Washington, D. C.

J. Bone & Joint Surg., 25:871-82, Oct. 1943

Fractures of the femur are a major problem in military surgery. A critical analysis of neglected cases is important. Twenty cases were selected for this purpose which have been admitted to the Walter Reed General Hospital during the last five years. Seventeen of them were under thirty years of age. The time interval from injury to admission varied from one day to two years. This series of cases shows failure and success after various methods of treatment for femoral-shaft fractures.

From this study, the author concludes that immobilization of the femur in a plaster cast is a good procedure for transportation but it does not prevent angulation and overriding, and its use for initial definitive treatment is not recommended. Prolonged immobilization in a plaster cast after the plating or bone graft delays the recovery of knee motion. Suspension traction is the simplest and safest method of treatment and its trial is recommended for the average case. This method requires constant attention, the taking of frequent roentgenograms, and prolonged bed care. Distraction must be prevented. Fractures which are not quickly reduced by traction should have prompt open reduction.

Dual-pin reduction is suitable in certain cases, particularly for single fractures of the shaft of the femur. It is not recommended for old fractures, for fractures near the joints, or for those with a large, free, displaced fragment. In these cases, traction or operation is preferred. A single half-pin or a wire in each fragment is not sufficient fixation for the femur. In the experience of the author, this method is the least comfortable and the resulting knee

motion does not meet expectations. Osteomyelitis does occur, and it is a serious complication that must be avoided.

Open reduction is an excellent method of treatment where facilities permit, and should be done as early as possible. However, open reduction with fixation alone does not assure union of the fracture. Success depends upon the use of material which is inert and of sufficient size and strength to be effective, and upon the preservation of an adequate blood supply. Bone-grafting is necessary in cases of non-union, and is recommended when open reduction must be performed more than eight weeks after injury. A massive graft with all layers of bone in firm contact with the host should be firmly fixed with long metal screws. The addition of a plate is not always necessary, but it does ensure fixation, and permits earlier knee motion. The results of this operation have been gratifying in the reconstruction of the femur in these cases. 12 figures.

TREATMENT OF INDUSTRIAL WOUNDS

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J. Iowa State M. Soc., 33:460-64, Oct. 1943

Steps in the treatment of industrial wounds may be listed as follows: (1) control of excessive hemorrhage, which, of course, is essential; (2) application of sterile dressing; (3) transportation of the patient to an institution where proper treatment may be carried out in an operating room; (4) preparation of the surgeon and assistants by putting on masks, rubber gloves, and so forth; (5) the cleansing of surrounding skin while the original sterile dressing is still in place; (6) removal of sterile dressing and examination of the wound for foreign material and injury to vital structures, such as nerves, blood vessels and so forth; (7) extensive irrigation of the wound so that every particle of contaminated material is removed; (8) debridement with removal of all loose tags of tissue so that the remaining surfaces have a good vascular supply; (9) ligation of all bleeding points with fine material; (10) repair of all important structures, such as tendons, nerves and so

forth; (11) the decision as to whether or not immediate closure is advisable; (12) administration of gas gangrene or tetanus antitoxin when indicated; (13) application of large soft dressings with some compression; (14) immobilization or placing the affected part at complete rest; and (15) no molestation of the dressing for several days unless the patient has an elevation of temperature or evidence of infection.

The most efficient method for cleansing the wound is to have large containers of normal saline solution or of dilute permanganate or Dakin's solution on hand. A stream of one of these solutions is kept running over the wound while it is being cleansed with a soft material, such as cotton, and with soap and water. This loosens the fragments of tissue in the wound and washes them away together with soiled material. No crevice must be left which may contain foreign material. Patients with wounds from gunshot or explosives are given immunizing doses of tetanus antitoxin. Large doses up to 5,000 units may be given as the initial dose, in cases of severe trauma.

A complete record of all accident cases must be kept, as the employer, the insurance company and the compensation board all expect the physician to furnish accurate statements concerning the accident, the extent of injury, diagnosis, treatment and prognosis as to future disability. The Carrel-Dakin method of treatment of infected wounds has given splendid results. A rigid technic is imperative, however. The oral use of sulfathiazole and sulfapyridine or the intravenous use of sodium salts proves most effective in infections of staphylococcus origin. Sulfanilamide by mouth or subcutaneously in the form of an 0.8 per cent solution in saline solution is still the method of choice for treatment of hemolytic streptococcic infections. The drug should be continued until all signs of infection have disappeared. Local application of these drugs has also been used with success. Badly injured extremities should be immobilized. The use of heavy catgut or other heavy material in ligating and suturing a wound should be avoided. When the patient is seen within two hours of the time of injury primary suturing may often result in healing. When the patient is seen later the open method of treatment is perhaps preferable. Three illustrative cases are reported in detail. 4 references.

ACUTE POST-TRAUMATIC ADRENAL FAILURE

(Asuprarrenalismo agudo post-traumática)

J. PALACIOS MACEDO

Mexico, D. F.

Cir. y ciruj., 11:429-40, Aug. 31, 1943

The author describes two cases of acute post-traumatic adrenal failure in a man of forty years and a woman of twenty-seven years of age. The man suffered a fall resulting in fracture of two ribs and cerebral contusion and concussion, with loss of consciousness for a few hours. The woman suffered an automobile accident, resulting in fracture of the upper third of the femur. In both of these cases, the symptoms of adrenal failure developed late (forty-eight hours and four days after the accident respectively). The symptoms included dyspnea, tachycardia, hypotension, pallor and extreme asthenia. Treatment consisted of administration of physiologic saline and adrenalin intravenously and oral administration of whole adrenal glandular substance. A few hours later, the symptoms subsided and after a few days disappeared altogether. This condition is frequently diagnosed at autopsy. In the living, it is frequently taken for cardiac insufficiency. Although clinical diagnosis may be impossible in some cases, the condition should be kept in mind in the presence of extreme asthenia of the myocardium following a severe trauma. Therapeutically, both the chromaffin and cortical portions of the adrenal must be administered, as these have a different and complementary action. The dose of whole gland administered orally in the cases here presented was 1 gram.

LOCAL THERAPY OF WAR WOUNDS WITH SULFASUXIDINE

R. J. V. PULVERTAFT (Major, R.A.M.C.) and D. H. MACKENZIE

Lancet, 2:379-84, Sept. 25, 1943

Experiments indicated that there is little breakdown of succinyl sulfathiazole (sulfasuxidine) in such solvents as plasma and fluid from wounds, indicating that the solubility of this drug is low

and that there is little danger of absorption of excessive amounts from its local application. Sulfasuxidine was applied locally to various types of wounds in 8 cases.

A lanolin cream with 20 per cent sulfasuxidine was employed; this was heated to 40° C. and applied with a syringe used as a "grease-gun." In most cases it quickly controlled infection with all types of gram-positive organisms, reduced suppuration and appeared to accelerate healing. There was no evidence of toxic or irritant effects in any case. The blood concentration of sulfathiazole was less than 1 mg. per 100 cc. in all cases. The authors note that sulfasuxidine may also be used intraperitoneally, but in this case the lanolin cream should not be used; a microcrystalline form "would be best" for intraperitoneal application.

SYMPOSIUM ON INJURIES OF THE HEAD, CHEST, AND BACK HEAD INJURIES

HARRY E. MOCK

Chicago, Ill.

Radiology, 41:527-31, Dec. 1943

It has been estimated that the annual crop of head injuries throughout the United States approaches 600,000. Approximately one-third of these are fractures. Motor-driven vehicles are responsible for 50 per cent of skull fractures. The majority of deaths from skull fractures and brain injuries occur in the first twenty-four hours following the injury. Head injuries will always be a problem for the general physician and surgeon. The type of management instituted in the first six to twenty-four hours spells life or death for many of these victims. Only about 6 per cent of skull fractures occur without injury of the brain. Standards of observation and of good, average and poor treatment were established in order to compare the management and results thereof in a series of 3,106 collected cases in a nation-wide survey, the second made by the author. From these observations which are tabulated, the author concludes that the type of management which gives improved results includes:

1. Treat cerebral shock first.

2. Avoid adding insult to injury.

3. Chart course hourly. Live with the patient.

4. Blood transfusion for persistent shock or severe associated injuries.

5. Oxygen early for persistent unconsciousness, cerebral anoxemia, threatened respiratory failure, or associated chest injuries.

6. Postural drainage or aspiration.

7. Adequate dehydration; spinal drainage; operation—*each when and if indicated by signs and symptoms.*

8. Avoid overdehydration. Maintain fluid balance without pushing fluids. Prolonged dehydration may be the cause of death.

9. Do spinal puncture early when indicated. Drain adequate amount of fluid. Early operation seldom indicated.

10. Maintain nutrition. Feed by stomach tube if necessary.

11. Avoid oversedation. Seldom, if ever, use morphine.

12. Consider the patient, not the family or the surgeon's convenience.

In ten years the author has reduced his mortality rate in these cases from 21 to 16.7 per cent. In nineteen hospitals in the United States the mortality rate in the best was 17 per cent, in the worst 42 per cent. Four hospitals made up the *good management group,* with an average death rate of 25 per cent. Ten hospitals belonged to the *poor management group* with an average mortality of 38 per cent. These were consecutive, not picked cases. 5 tables.

THE TREATMENT OF TRAUMATIC BURSITIS BY INTERNAL PARACENTESIS

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Am. J. Surg., 62:165-68, Nov. 1943

Confronted by many cases of traumatic bursitis among shipbuilders, the author has utilized a simple, semi-conservative mechanical procedure, actually an internal paracentesis or bursotomy, which has proved of considerable value and entails no loss of time. The operation consists of creating a wide communication between the bursal sac and the adjacent subcutaneous tissues. This is ac-

complished by passing a thin, long cataract knife into the bursa from without, then cutting a wide semicircular opening through the bursal wall into the adjacent subcutaneous tissues. The bursal fluid disperses through the opening and is absorbed. The patient uses the part freely and the communication permits continued fluid absorption until the process quiets down and signs and symptoms disappear.

In cases of olecranon bursa, the area is thoroughly prepared surgically and draped. With the elbow flexed, a skin area one-third of the distance from the distal bursal margin and directly over the center of the bursa is anesthetized with a few drops of novocaine. Five to 10 cc. of the procaine are then inserted directly into the bursal sac. The cataract knife is thrust directly through the anesthetized area into the bursal cavity. The knife is then tilted distally and with a semicircular motion, the entire distal bursal sac is incised into the adjacent subcutaneous tissues of the forearm. The knife is withdrawn and the bursal fluid forced through the internal communication down into the forearm. A sterile dressing is applied over the knife wound, and the patient returns to work. The entire operation takes five to ten minutes. The patient is instructed to use the arm freely. There is little pain associated with the procedure, since the internal-bursal procaine anesthetized the lining of the sac.

For the prepatellar bursa, the intrabursal incision is made through the superior portion, care being taken not to enter the suprapatellar pouch of the knee joint. The olecranon and prepatellar bursas have been the only two on which the author has used this procedure to date. In all, 14 cases were treated by this method. All went on to complete recovery without complication. In two of the cases, the original aperture was inadequate, the communication closed prematurely and the procedure had to be repeated. In some cases a change of occupation was advised where continued exposure could not be avoided, or the patient was advised to use a protective pad at work. It is important that the part not be splinted after paracentesis. None of the patients required postoperative analgesia. The operation is indicated in subacute and chronic bursitis of traumatic origin without significant rice-body formation. It should not be used in the acute hemorrhagic cases.

Aspiration and the usual routine are there indicated. Internal paracentesis should be performed after the acute reaction has subsided when it is apparent that a rapid disappearance of effusion is not taking place. It should never be used when there is any indication of infection or neoplasm. 6 figures.

TREATMENT OF HABITUAL DISLOCATION OF THE SHOULDER BY MEANS OF A METAL BAR IMBEDDED IN THE NECK OF THE SCAPULA AND CORACOID PROCESS (*Behandlung der habituellen Schulterluxation mit einer im Schulterblatthals und im Processus coracoideus verankerten Metalbarrière*)

R. RAMSER

Helvetica med. act., 10:377-80, June 1943

In 1936, Brun stated that from a statistical study the methods of Oudard and Eden appeared to give best results in the treatment of habitual dislocation of the shoulder, Eden's method being acknowledged as the standard operation for all forms of dislocation of the shoulder. The author used the Eden modification of the Brun procedure in a girl of 18 years suffering from habitual dislocation of the shoulder. For nearly two years the results seemed perfect. Twenty-two months after the operation, however, dislocation recurred. Roentgen examination and another operation showed that the bone graft had been completely resorbed except for a tiny fragment in the bony pocket in the neck of the scapula. For this reason the author determined in this operation to make use of a non-resorbable material, i.e., rustless steel. A bar in the form of a clamp was constructed. The peg intended for the neck of the scapula measured 5 cm. and extended extracapsular 1½ cm. beyond the acetabular margin. The shorter peg measured 2½ cm. and was buried in the coracoid process. The bar connecting the two limbs measured 4 cm. and was slightly arched. The longer peg was driven extracapsular into the acetabular margin in the direction of the spine and the shorter peg was driven in the axis of the coracoid process. The steel wire used was 2 mm. thick and sharpened down to 1/10 at the tips where it was slightly angular with transverse grooves.

The operative technic is very simple. Following retraction of the pectoral and deltoid muscles the coracoid process is immediately encountered. The anterior acetabular margin can usually be easily palpated owing to usual atrophy of the subscapularis in habitual dislocation of the shoulder. The technic may be further simplified by selecting a peg measuring ½ cm. less in length and a coracoid peg ½ cm. longer. By so doing one may drive both pegs into the bone 3 cm. by means of an iron bar containing a groove for reception of the middle bar. The pleated capsule is united with the short bicep tendon over the bar. The wound is then closed. After the operation, the arm is fixed to an abduction splint for several days, after which gymnastic exercises are begun. Three weeks after operation the patient was able to aid in harvesting hay.

FRENCH METHOD OF REDUCING SUBLUXATION OF SHOULDER

KELLY HALE

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Ohio State M.J., 39:1006-07, Nov. 1943

The author describes conversion of ordinary dislocation of the shoulder into a Luxatio Erecta type, i.e., with the arm dislocated and locked in the upright position. Under light anesthesia it can then be easily reduced by making slight traction upward on the wrist parallel to the long axis of the body. The arm is then swung outward through a semicircle maintaining pressure on the head in the axilla with the other hand. The author has used this procedure over a period of six years. Instead of binding the arm to the side, a cuff is placed above the elbow. A cord long enough to permit abduction to 45 degrees connects the cuff and body belt. Capt. William Regan has used this method successfully on 5 or 6 cases in his camp, and demonstrated the procedure on a patient in which the usual method had failed. The medical officer adopted it with enthusiasm and success on other patients, no anesthetic being required. This method was used long ago in France and England. 19 references. 2 figures.

General

CONTINUOUS CAUDAL ANALGESIA IN SURGERY

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Ann. Surg., 118:945-70, Dec. 1943

Caudal anesthesia as employed in surgery is of three types, low caudal block, mid-caudal block and high caudal block. For all these types of caudal anesthesia the authors employ a 1.5 per cent solution of metycaine and a special malleable 10-gauge steel needle, which remains in the sacral canal throughout the operation (for continuous anesthesia). The needle should be introduced into the sacral canal through the sacral hiatus "with the bevel posteriorly" so that it will slide along the posterior wall of the sacral canal without piercing the periosteum or any of the veins; careful aspiration should be done when the needle is in place to determine whether cerebrospinal fluid or blood is present; if spinal fluid is obtained, caudal anesthesia should not be attempted for at least another twenty-four hours. If blood is present, the needle should be withdrawn a few centimeters, "gently rotated" and reinserted; after a "bloody tap" injection of the anesthetic may be begun immediately in robust patients; in "poor risk" and elderly patients, the anesthetic solution should not be injected for at least ten minutes. In low caudal block, the anesthesia does not extend above the first lumbar segment; this type of caudal block is suitable for operations on the rectum and the perineum, for vaginal operations, and for intraurethral operations. For low caudal block, an initial dose of 30 cc. of the 1.5 per cent metycaine solution is used which is given slowly; if subsequent injections are required to maintain anesthesia, 30 cc. may be given at hourly intervals. Mid-caudal block is used when complete conduction block is required in the upper lumbar and lower thoracic segments and the segments below; it is suitable for operations on the pelvic organs, for suprapubic prostatectomy, for repair of inguinal or femoral hernia. By varying the technique for operations on the lower extremities, recent experience has shown that this type of caudal block is also suitable for appendectomy and repair of ventral hernia. It has proved of value in the

treatment of injuries below the umbilicus, as compound fractures of the lower extremities and the authors suggest that it may be of use in military medicine. The initial dose of the anesthetic solution for mid-caudal block is 30 cc.; five minutes later another dose of 30 cc. is given, and the operating table is tilted; if the operation is on the pelvis or abdomen, the table is tilted down by the head, 5 degrees; if the operation is on the extremities it is tilted down by the foot, also 5 degrees. To maintain anesthesia, subsequent injections of 40 cc. are given "as required." High caudal block has been employed in only a few cases (33), but the results have been encouraging; in this type of caudal block, anesthesia extends to T4 or above; to induce this type of anesthesia, the initial dose of the anesthetic solution is 30 cc.; after five minutes the table is tilted head down 5 degrees and a second 30 cc. given; after another five minutes a third dose of 30 cc. is given. If additional doses are required, 50 cc. are given. Many patients do not require premedication with caudal block; if there is restlessness under the anesthesia, "minimal doses" of pentothal sodium are given. Postoperative complications, such as atelectasis, distention, urinary retention, vomiting and phlebitis are rare, in patients operated on under caudal block. Motor paralysis disappears rapidly and the patient is able "to move about" in bed. Sensory block fades gradually so that there is but little pain in the wound. Syncope may occur during or after the initial injection of the anesthetic, but patients regain consciousness promply and show no ill effects. Nervousness, nausea and vomiting occur in some patients, but in the authors' experience such complications are not frequent. Continuous caudal anesthesia has been used in 903 surgical cases; peripheral circulatory collapse occurred in 2 instances; in both cases it was due to too rapid onset of upper level analgesia and too rapid absorption of the anesthetic after "a bloody tap"; in both patients the circulation improved promptly after the administration of ephedrine. Infection occurred at the site of caudal injection in 2 cases, but the sacral canal was not involved in either instance and there was no nerve damage. The authors now employ sulfathiazole ointment to "seal" the junction of the skin and the needle. Caudal anesthesia gave a satisfactory anesthesia in 96.7 per cent of the operations in which it was used.

CONTINUOUS SPINAL ANESTHESIA IN RELATION TO UPPER ABDOMINAL SURGERY

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J. Internat. Coll. Surgeons, 6:448-51, Sept.-Oct. 1943

The Lemmon method of continuous spinal anesthesia has been employed in 24 gastrectomies. The special mattress was easily made; as it was not possible to obtain the apparatus used by Lemmon, Carrel-Dakin tubing which has a very small bore was employed, and it was given "the necessary stability" by surrounding it with pieces of No. II catheters. The Lemmon method was modified by giving the first 200 mg. of novocaine with the syringe in the usual way for spinal anesthesia; the tubing was then connected with the needle and the Lemmon technique followed for maintaining anesthesia. In the 24 gastrectomies done with this type of anesthesia, the Polya technique was used; the operations lasted from an hour and a quarter to an hour and a half; the average dose of novocaine was between 300 and 400 mg. The spinal anesthesia was supplemented by "a small quantity" of ether in 2 cases. Intravenous saline infusion was begun before operation and continued during operation. In all cases the patient's condition during the operation was good and there was no sign of shock at any time. In all but the 2 cases noted, the form of anesthesia used "left nothing to be desired."

ONE-SIDED SPINAL ANESTHESIA

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Illinois M.J., 84:393, Dec. 1943

The author has found the glucose fixed spinal anesthetic as practiced at the Lahey Clinic very satisfactory indeed. In extremity work he observed that if the patient was kept on his side for several minutes, the fixation was almost one-sided. Exploiting this observation, he now uses the following technic for unilateral extremity surgery:

The patient is turned on the injured side and his head elevated on two pillows. The site is injected with a wheal of 1 cc. of ephedrine and procaine. The subarachnoid space is punctured between the 4th and 5th lumbar with a 22-gauge needle and a free flow spinal fluid obtained, then 1 cc. of 1 per cent solution of pontocaine (10 mg.) which has been mixed with 3 cc. of 10 per cent dextrose, is injected slowly in about 30 to 45 seconds. After removal of the needle, the patient is held in this position for five minutes, then turned on his back to the operating position, with his head still on the pillows. There will be little blood pressure change. The small dose of ephedrine keeps it at about a preoperative level. Motor fixation is usually absent on the uninjured extremity, though there are some anesthetic paresthesias in this leg. This method has been very satisfactory in elderly patients who have had surgery for trochanters and necks of femurs.

If procaine is used, then about 1 cc. of 10 per cent solution (100 mg.) fixed with 3 cc. of 10 per cent dextrose should produce satisfactory one-sided anesthesia. In inguinal hernias, the author has found that it does not go high enough, so the usual technic is used and recommended. The author has had two failures of adequate one-sided fixation, attributed to holding the patient on the side too long, and in too steep an elevation of the head of the table, as well as using too little anesthetic agent. No distressing sequellae or post-anesthetic headaches of this one-sided fixation were noted.

PENTOTHAL SODIUM IN MAJOR SURGICAL PROCEDURES

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Am. J. Surg., 62:13-18, Oct. 1943

Intravenous pentothal anesthesia has been employed in many major surgical operations in the author's practice as anesthetist. Premedication is given so that the patient is quiet and often asleep when brought to the operating room. As a rule seconal (1½

grains) is given the evening before operation; thirty minutes before operation, pantapon (1/3 grain) and atropine sulfate (1/150 grain) are given by hypodermic. Less premedication is required for older patients over 55, but 1/150 grain atropine is always given, as this prevents laryngeal spasm, hiccough and respiratory depression. A 2½ per cent solution of pentothal sodium is employed (1 gm. in 40 cc. sterile, distilled water); the solution is injected slowly into a vein in the antecubital space at the rate of 2 cc. in thirty seconds; the needle is kept in position in the vein by means of two small strips of adhesive. After the initial injection of 2 cc. the patient is carefully observed to determine the depth of anesthesia, and from ½ to 1 cc. of solution given as necessary as the operation progresses. The two most important signs of surgical anesthesia are quiet, regular, depressed respirations and abolished lid reflex. If the patient begins to come out of anesthesia, the amplitude and rate of the respirations increase and the lid reflex becomes active; the administration of ½ to 1 cc. of the pentothal solution increases the depth of the anesthesia in thirty seconds if given promptly when these signs appear. The surgeon does not make his incision until surgical anesthesia is established. By the use of a three-way valve, intravenous fluids, such as 5 per cent glucose, are given during the operation, turning off the flow of this fluid only when it is necessary to administer the pentothal solution to maintain anesthesia. As a rule 1½ to 2 gm. of pentothal sodium are required for operations of one and one-half to two hours; the largest amount of pentothal given in any of the author's cases "to date" is 2½ gm. This was for an operation on a "robust young man" lasting three hours. The administration of pentothal is continued as indicated until beginning closure of the wound. With pentothal sodium anesthesia relaxation of the jaw occurs early, and this requires the insertion of a rubber airway. When surgical anesthesia is established a mask is applied to the patient's face and 300 to 400 cc. of oxygen given through a circuit carbon-dioxide filter; oxygen is continued throughout the operation, and at the end of the operation the patient is allowed to rebreathe a mixture of 5 per cent carbon dioxide and 95 per cent oxygen for one minute. Pentothal sodium is not indicated in children under twelve, who usually "do not

have good veins to inject"; and who do not tolerate intravenous barbiturates well. Pentothal is also contraindicated if sulfonamides have been given up to the time of operation, as the sulfur of the sulfonamides retards the elimination of pentothal; pentothal may be used, however, if the sulfonamide is discontinued twenty-four hours before operation; otherwise the author has not found any contraindication to the use of intravenous pentothal anesthesia. This type of anesthesia must be administered by a trained and experienced anesthetist, but so administered by the technique described it is suitable for good and bad surgical risks, even for patients in shock; it is especially indicated for patients with respiratory tract disease. The author has not had a single death attributed to the anesthesia during or after the operation. There is no postoperative vomiting; if medication is needed for the relief of pain, pantapon may be given in a dosage of 1/3 grain every four hours for twenty-four hours.

MIXED PENTOTHAL-CYCLOPROPANE ANESTHESIA

(L'Anesthésie Mixte Pentothal-Cyclopropane)

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Laval méd., 8:708-13, Dec. 1943

Mixed pentothal and cyclopropane anesthesia has been employed recently by the author. The preliminary medication consists in 1½ grains of nembutal the night before operation, and 1/6 or 1/8 grain morphine with 1/150 grain atropine an hour before operation. The dose of morphine must not exceed 1/6 grain because its depressant action on the respiration is increased by pentothal; in nervous patients hyoscine may be used instead of atropine, as it has an antispasmodic and secretion-diminishing action similar to that of atropine, and a definite hypnotic action. Pentothal may be used only for the induction of anesthesia, giving 5 to 10 cc. of a 2 per cent solution intravenously, giving cyclopropane with oxygen to maintain anesthesia; even with this method the amount of cyclopropane necessary is diminished. Larger

amounts of pantothal may be used to induce and maintain anesthesia, using oxygen-cyclopropane only at end of the operation; in this case only a small amount of cyclopropane is used, but the final injection of pentothal that would have been necessary to finish the operation is avoided. Cycloprapane may be used first, and pentothal injected either during the period of excitation, if this is prolonged during induction of anesthesia, or during the operation if any abnormal cardiac rhythm develops under cyclopropane. In such cases, the amount of oxygen is increased and 2 to 3 cc. of a 2 per cent solution of pentothal injected intravenously. The author prefers to induce anesthesia with pentothal; as soon as anesthesia is established oxygen-cyclopropane is administered slowly; if there are signs of the patient's coming out of the anesthesia during operation, anesthesia is deepened as necessary by alternating cyclopropane and pentothal. For extra-abdominal operations the author prefers to use more cyclopropane for this purpose, for abdominal operations, more pentothal; in the latter, a small dose of pentothal is given as a routine when the surgeon prepares to close the peritoneum, as this produces good muscular relaxation. The amount of pentothal necessary to main anesthesia does not exceed 2 to 4 cc. for each injection.

The advantages of this type of anesthesia in the author's experience are: Induction of anesthesia is facilitated; there is no period of excitation, and the patient suffers none of the discomfort of induction of inhalation anesthesia. Cyclopropane acts synergistically with pentothal, so that the dose of each anesthetic is less than that required when either is used alone, and there is less danger of toxic effect. When cyclopropane is used alone, postoperative nausea or vomiting occurs in 50 per cent of patients; with pentothal-cyclopropane the incidence of these symptoms is reduced to 10 per cent. The chief disadvantage of the combined anesthesia is that hemorrhage with resultant shock is more apt to occur than with ether anesthesia; it should not be used for such operations as mastectomy or an extensive gastrectomy; or a blood transfusion should be given during operation. The patient must be very carefully watched for the first few hours after operation with this combined anesthesia; the airway must be kept free, and if there is respiratory depression to the point of cyanosis, oxygen should

be given with a mask or nasal catheter and 5 cc. of coramine given intravenously. Morphine should be given, if indicated, in only about half the usual dose, because it increases respiratory depression. The author is of the opinion that demerol, the new narcotic, may replace morphine in the postoperative period because it does not depress the respiratory centers.

USE OF SODIUM PENTOTHAL ANESTHESIA

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Virginia Med. Monthly, 70:613-14, Dec. 1943

This paper is based on 600 consecutive cases in which sodium pentothal was used as the sole anesthetic. At present the author rarely uses any other anesthetic for patients between the ages of fourteen and sixty years.

Sodium pentothal 5 per cent solution is given with an ordinary 50 cc. syringe with rubber tubing and needle. The syringe is held in a Rudder Syringe Holder which is clamped to an arm board, allowing the anesthetist to sit at the head of the table and administer oxygen which is essential to a good anesthesia. Preoperatively the average adult is given morphine grs. ¼ and atropine gr. 1/150. If the patient ceases to breathe for a few moments during induction, carbon dioxide and oxygen under pressure restores respirations in a minute or two. A small dose of nitrous oxide will relieve hiccup. One patient coughed through the entire operation for a ruptured appendix, but anesthesia was satisfactory. One patient nearly died in general collapse as the incision was being closed but revived under adrenalin, picrotoxin and artificial respiration. The author has done twelve Cesareans to date, giving only atropine preoperatively. The anesthesia was used for many types of operations including cholecystectomies, gastro-enterostomies, hysterectomies, salpingectomies, pelvic operations, orthopedic operations, enucleations and muscle operations, thyroidectomies, mastectomies, cystotomies, etc.

The advantages of sodium pentothal anesthesia include ease of administration and induction, perfect relaxation, reduction of

operating time and lower mortality rate. Patients come out of the anesthetic just as if they were waking from ordinary sleep. Recovery time is shortened. There was only one death in 600 cases, or less than two-tenths of one per cent.

WOUND HEALING; EXPERIMENTAL AND STATISTICAL STUDY; BACTERIOLOGY AND PATHOLOGY IN RELATION TO SUTURE MATERIAL

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Surg., Gynec. & Obst., 77:481-92, Nov. 1943

Using rats as the experimental animals, studies were made of the healing of wounds with different types of suture material, including absorbable sutures of catgut and nonabsorbable sutures of silk, cotton, nylon and wire. Grossly wounds sutured with the various nonabsorbable materials showed little difference in appearance; very little serum was present and this did not persist after the third or fourth day. Histologically fibroplasia, collagen formation and maturation were practically the same with all the nonabsorbable sutures studied; the inflammatory reaction was somewhat more intense and prolonged with silk and cotton sutures than with nylon and wire sutures; but the rate of healing was practically the same. Studies on the tensile strength of these sutures gave results in agreement with these findings. With catgut sutures, serum was present in the wound up to the ninth day. In catgut wounds edema was present for a considerable time and the maturation of fibroblasts and collagen was definitely retarded as compared with wounds sutured with nonabsorbable material. The inflammatory reaction in catgut-sutured wounds was "acute, intense, prolonged and associated with widespread death of tissue and abscess formation." Mature fibroblasts and collagen were noted a day earlier in wounds sutured with chronic catgut than in those sutured with plain catgut, but there was little difference in the healing of these wounds as shown by studies of tensile strength. Fragments of chromic catgut were found in wounds at the end of two months, and an inflammatory reaction was present around

such fragments. Nonabsorbable suture material was also present in wounds after two months, but it was fragmented and encapsulated by fibroblasts, showing evidence of a foreign body reaction, but not an inflammatory reaction.

The experimental animals used in these studies, rats, are "very resistant to infection" and only 2 gross wound infections occurred among "several hundred" animals operated upon with a sterile technique. However, as other investigators have shown that "practically all" operative wounds are contaminated, usually by airborne bacteria, a bacteriological study was made of the wounds in this series of experiments. It was found that 20 per cent of the catgut-sutured wounds showed positive cultures, *Staphylococcus aureus* and nonhemolytic streptococcus predominating. From 4.7 per cent to 7.8 per cent of the wounds sutured with nonabsorbable materials showed positive cultures with the one or both of the same organisms; the lowest incidence of positive cultures (4.7 per cent) was noted with cotton sutures. The higher incidence of positive cultures in the catgut wounds is attributed to the presence of the inflammatory reaction, which presents a "better medium for bacterial growth."

CHLOROPHYLL; AN EXPERIMENTAL STUDY OF ITS WATER SOLUBLE DERIVATIVES IN WOUND HEALING

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Am. J. Surg., 62:358-69, Dec. 1943

In experiments on animals, the effect of the topical application of chlorophyll derivatives and other agents on the healing of surgical wounds and burns was studied. A series of 1,372 topical applications was studied with a control series of 878 similar wounds and burns. The chlorophyll water soluble derivatives were used in five vehicles: 0.2 per cent alkaline solution (pH 7.3 to 7.8); 0.2 per cent acid buffered solution (pH 6.6 to 6.8); lanolin base ointment (0.5 to 3.0 per cent); petrolatum-cholesterol base ointment (2.0 per cent); hydrophilic base jelly (1.0 per cent). These various chlorophyll preparations showed a "statistically significant"

accelerating effect on wound healing. In 448 lesions in which the chlorophyll preparations were used for topical application, the healing of the wounds was accelerated by 24.9 per cent in time, in 394, or 67.9 per cent of cases. Vitamin B, C and D ointments showed no demonstrable effect on the time of wound healing. Biodyne and methionine ointments and Castilian malva wet dressing caused a slight acceleration of wound healing—less than 10 per cent in time—in about a third of the cases in which they were used for topical application. Sulfa compounds—powdered sulfanilamide or sulfathiazole, sulfathiazole ointment and sulfadiazine spray—caused a definite retardation of wound healing except when active infection was present. Tetrodine, "an active, stable, aqueous soluble iodine preparation," reduced the healing time when infection was present (in about half the cases) but caused some delay in healing if there was no infection. Scharlach R ointment was "essentially inert," acting only as a "protective dressing" and having no effect on the time of wound healing. From these findings the authors conclude that chlorophyll preparations "should be used much more extensively in the treatment of wounds and burns."

USE OF DRIED RED BLOOD CELLS IN WOUND HEALING

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Proc. Staff Meetings Mayo Clinic, 18:385-89, Oct. 20, 1943

Moorhead and Unger have presented a new use for the residual red blood cells derived from mass production of blood plasma. Red cells from a single blood group or from different blood groups may be mixed together and stored in a refrigerator for a few days or weeks. During this interval the red blood cells form a gelatinous mass, which may be used as a dressing material for wounds, such as open joints, infections, burns, ulcers and so on. This dressing seems to aid the ingrowth of new tissues when applied to certain wounds. One difficulty encountered is that of keeping the semi-liquid material in contact with the wound. It was then decided to dry the gelatinous mass and use it as a dusting powder.

using the Harper and Osterberg method for drying blood plasma. Recently a commercial firm has offered to dry the red blood cells in large quantities. The powdered red blood cell preparation is kept in sterile, glass containers and has a moisture content of approximately 1 per cent. The powder is either dusted on the wound or applied by a sterile spatula. One or two applications are used daily. The wound is covered with a dry, sterile dressing. When the dressings are changed, little powder is left in the wound, since some of it has caked on the dry edges of the wound and the rest has been absorbed by the dressing which has become moistened by the exuding of serum through the wound surface. A noticeable odor may develop in some cases. In three cases, one of an empyema wound, and two cases of excision of pilonoidal cysts, the application of these dried blood cells caused such severe burning pain that the treatment was discontinued. Other wounds made by excision of pilonoidal cysts have been treated with seemingly satisfactory results. Three cases are briefly described. Skin grafts, applied to tissue on which this treatment has been used, seem to take a little more readily than when applied to old indolent tissue.

The types of cases treated with the dried blood cell powder included infected wounds, postoperative abdominal wounds, which had not healed above the fascial layer, certain proctologic cases, varicose and other ulcers of the leg, amputation stumps, open chest wounds, and so forth. The results have not been uniformly beneficial, but are sufficiently promising to warrant more investigative work along this line. It is suggested that eventually bovine cells might be employed instead of human blood cells. 3 figures.

DIGITALIS IN THE TREATMENT OF WOUNDS

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J. Internat. Coll. Surgeons, 6:443-47, Sept.-Oct. 1943

In the use of digitalis in the form of digalen compresses or digalen ointments in the treatment of wounds of various types, the author found such dressings produced an intense local reaction

due to the action of digitalis on the cells of the capillary walls; the edema is lessened, the capillary flow increases and this favors cell metabolism and the regeneration of tissue. Treatment with digalen compresses at first and subsequently with digalen ointment has proved of special value in the treatment of torpid granulating wounds of the leg following extensive lacerating injuries with or without fracture. Even though the fracture heals, the torpid ulcer persists. The compresses saturated with digalen solution resulted in "filling in" the wound with healthy granulations in a few days; then the application of 20 per cent digalen ointment hastened epithelization. Burns have been treated in the same way with good results. Digalen ointment has also been used to hasten healing of third-degree burns after removal of the eschar produced by tannic acid or other dressings. Digitalis compresses used in the operative wound immediately after operation are of value in obtaining primary union in some cases, especially in debilitated persons; in such cases hemostasis must be "complete" and good approximation of the different layers of the wound must have been obtained.

THE EFFECT OF SULFUR COMPOUNDS ON BLOOD CLOTTING

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Surgery, 14:661-68, Nov. 1943

A test of the clotting mechanism has been devised which consists in determining the individual's response to a test dose of heparin. In this test the coagulation time of the capillary blood is determined before and ten, twenty, thirty and forty minutes after the intravenous administration of 1 cc. (10 mg.) purified heparin. On the basis of the results of this test, individuals can be classified as hyporeactors, normal reactors, and hyperreactors. With the use of this test it was found that sulfur compounds given intravenously definitely increase the patient's response to heparin. Sulfonamide drugs by mouth increase the patient's response to

heparin, but these drugs cannot be used safely for this purpose, and as yet no simple and safe method for the administration of sulfur by mouth has been found that has a consistent effect on the response to heparin. In previous studies it has been found that the heparin curve becomes "flat," indicating a clotting tendency, for two or three days after major operations. The author and his associates have found that the administration of sodium tetrathionate in the intravenous fluid given postoperatively (0.6 gm. to every 1,000 cc. fluid) increases the reaction to heparin, thus tending to overcome the clotting tendency. The author is of the opinion that the administration of either heparin or dicoumarol to surgical patients for this purpose will never become routine, but that sodium tetrathionate, which is nontoxic and inexpensive, may well be employed routinely to reduce the clotting tendency after operation; it is now so used on his surgical service. A series of many hundreds of cases must be collected before its effect in decreasing postoperative thrombosis can be definitely determined.

SURGERY IN MEDICAL EMERGENCIES

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J. Iowa State M. Soc., 33:464-67, Oct. 1943

The author discusses the problem of surgery in medical emergencies under the headings of: (1) heart injuries, (2) peripheral vessels, (3) the common cold, (4) diabetes mellitus, (5) cardiac failure, (6) tuberculosis and (7) geriatrics. The symptoms and possible complications of heart injuries are described. The mortality rate is dependent upon the type and location of the wound and on the promptness with which surgical aid is given. Prognosis is better in ventricular than in auricular wounds. Surgical intervention should be instituted within an hour or two. The surgical treatment of Pick's syndrome consists of the removal of the pericardial scar and is not an emergency measure. It must be performed at a time of election and by a specially trained surgeon.

In diseases of the peripheral vessels, the first concern must be to restore the original circulation and to promote therapeutically

the development of an adequate collateral circulation. In some cases of obstructed circulation there is no embolus but spasm. Heat hastens the onset of gangrene and should not be used in questionable cases of occlusion. The spasm may be released by intravenous injection of papaverine hydrochloride in 0.5 grain doses every four hours. To prevent thrombosis of the collateral circulation and spreading thrombus formation, heparin is given intravenously every four hours in doses of 50 mg. each. If the patient does not improve, embolectomy may be required.

Elective surgery should not be performed even if there is only a suspicion of an upper respiratory infection. In some cases, however, as for instance in acute appendicitis or strangulated hernia, surgery will be indicated even in the presence of an acute upper respiratory infection. Ether should never be used in such cases. Nitrous oxide or ethylene may be used at times. Preferably spinal or local anesthesia will be the one of choice. The operative procedure should be short as possible and postanesthetic care should include carbon dioxide inhalations, and the latter should be repeated three or four times daily. The reduction of pulmonary complications in patients on such a regime is striking. Lastly, one of the sulfanilamide preparations should be used postoperatively in questionable upper respiratory infections. The author uses either sodium sulfathiazole or sodium sulfadiazine intravenously.

In diabetic patients to be operated upon, examinations of the urine and blood for sugar must of course be made. In emergency surgery a blood sugar test can be done quickly, and in elective surgery a sugar tolerance test is indicated. Every surgical diabetic patient must be regarded as a candidate for coma. The treatment for hyperglycemia and hypoglycemia is reviewed. In the early stages the acidosis of diabetes may itself simulate various surgical conditions such as appendicitis, duodenal ulcer, acute pancreatitis or intestinal obstruction. If spinal anesthesia can be used, the patient's previous management in regard to diet or diet plus insulin may not have to be interrupted. If inhalation anesthetics are used, the insulin dosage postoperatively may have to be varied, and, if nausea develops, glucose may be administered intravenously.

In patients with cardiac symptoms due to toxic goiter pre-

operative lugolization will do more good than digitalis. The surgeon, in dealing with a cardiac patient, must always endeavor to ascertain the cause of the cardiac disturbance. The presence of gross enlargement of the heart arrhythmias, signs of failure, or unexpected blood pressure readings should suggest consultation with a competent internist. Rest in bed, sedatives, limitation of fluid intake, liquid diet, and digitalis are important. Organic mercury compound may be given to relieve edema, and cyanosis may be relieved by the oxygen tent or oxygen through the nasal catheter. Once compensation has been reestablished, the risk of the usual surgical procedures is often not much greater than in patients without cardiac disease. It is often wise, however, to let the patient go home for a month or two before operation to demonstrate his ability to carry on without becoming decompensated again. If not, elective operation should be performed only for the relief of considerable pain or other stress.

Urgent surgery is handled in the same way among tuberculous as among non-tuberculous patients. Preanesthetic preparation is important. Nembutal or seconal may be given from two to two and one-half hours before operation, for appendicitis for instance, followed by morphine sulfate and scopolamine, or scopolamine alone, from one to one and one-half hours before the anesthetic. Spinal anesthesia is good and nitrous oxide and ethylene or cyclopropane can be used. Ether should not be used. Non-urgent surgery should be delayed until the optimum time as related to the progress of the pulmonary disease. Intestinal tuberculosis now responds to ultraviolet light and vitamin treatment so that surgery is superfluous. Hernia operations should be postponed in tuberculous patients until the cough has ceased or is entirely controllable.

In old patients requiring surgery it is important to evaluate general health and psychology. Attention must be given to hydration, oral hygiene and cardiac disability. Blood-pressure readings are of value. Preoperatively glucose and saline may be given the day before the contemplated operation. Also adrenal cortex a day or two before operation may help to prevent shock, as likewise morphine and scopolamine an hour before operation. Digitalis is used in nearly all serious operations on aged subjects. The

anesthesia may be spinal, ethylene induction, cyclopropane or avertin. Speed and gentleness are needed with as little injury to the tissues as possible. Useful postoperative measures are described, including frequent change of position, intravenous glucose and saline, Trendelenburg position, warmth to the legs and early active and passive motion of the extremities. Prostigmine methylsulfate may prevent postoperative distention. Alcohol, blood transfusions and, in cases of infection, sulfanilamides may be used.

SURGICAL TREATMENT OF THE AGED

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Minnesota Med., 26:884-90, Oct. 1943

In 1939 and 1940, 1,364 operations were performed on 1,204 patients 65 years of age and over. The multiple operations included both two-stage operations and multiple operations on the same patient for unrelated conditions. The mortality rate for emergency operations was 37 per cent, clearly indicating the increased risk of emergency operations for patients in the older age groups. That the danger of emergency operation may be avoided by "prophylactic" surgery in certain conditions is suggested by the fact that there were no deaths in 79 elective operations for hernia in this series, while the mortality for emergency operations for hernia was 31 per cent. In 114 operations for benign lesions of the thyroid gland, there were 9 deaths; all these deaths occurred in the 80 operations for adenomatous goiter with hyperthyroidism; operation should be done in such cases before complications have developed. In 649 operations for benign lesions, the mortality was 7 per cent; in 479 operations for operable malignant lesions, the mortality was 8 per cent; in 241 exploratory or palliative operations for inoperable malignant lesions, the mortality was 16 per cent. Postoperative complications were of relative high incidence in these patients. Infections of the urinary tract occurred in 145 cases, but were usually not of serious significance, and were easily controlled by chemotherapeutic agents. Respiratory complications

other than embolism occurred in 120 cases and were a primary or contributing cause of death in 53 instances. The author is "hopeful" that the incidence of these complications can be reduced by the increased postoperative use of chemotherapeutic agents and inhalations of oxygen and carbon dioxide, as well as frequent changes of position and getting these patients out of bed early. Pulmonary embolism occurred in 30 cases, 20 of which were fatal. The recent development of heparin and coumarin may "materially decrease" the danger of this complication. Wound infections occurred in 64 cases, chiefly in operations for malignant disease of the colon, but were not a contributing cause of death in any instance; the local use of chemotherapeutic agents should decrease the incidence of wound infection. Cardiac disorders occurred in 26 cases, and were a primary or contributing cause of death in 10 cases; the author is of the opinion that little can be done to eliminate the danger of cardiac disorders in this older age group; it is very difficult to estimate "the ability of the heart to carry through an operative procedure." Thrombophlebitis occurred in only 20 cases, a lower incidence than was to be expected in this age group. In operations on persons of the older age groups, "physiologic rather than chronologic age is of primary importance"; careful preoperative preparation is essential for best results; because of the special danger of emergency operations in older persons, "preventive surgical procedures" should be "more earnestly advocated" for this age group than for younger persons.

SURGICAL COMPLICATIONS OF BRUCELLOSIS

(Complicaciones quirúrgicas de la brucelosis)

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Cir. y. ciruj., 11:441-52, Aug. 31, 1943

The author describes in detail four cases of brucellosis with surgical complications. Diagnosis of brucellosis was confirmed by positive Huddleson tests, selective agglutination, allergy and opsonization. The first patient presented a giant cyst of the ovary, with acute symptoms of twisted pedicle. A complete laboratory

study of the wall of the cyst and its contents showed the brucella organism to be the cause. The patient was 60 years old, but recovered nicely following operation. She had suffered from undulant fever and arthralgia for a period of nine months. Only blood culture was negative.

The second case presented a giant painless hygroma of the left knee. This was easily excised and the patient recovered promptly without further complications. Intermittent effusions of the joint had developed during the two terminal months of the febrile period of brucellosis. Roentgenographic examination showed the rest of the skeleton and the joint to be intact. The contents of the hygroma was slightly sanguineous. The patient was referred after operation, for physiotherapy, including massage and mobilization of the knee. Complete function of the knee was restored.

The third patient suffered from what was believed to be sacrolumbar Pott's disease and a large abscess in the iliac fossa. Puncture of the abscess yielded a yellowish fluid, giving positive reactions for *brucella melitensis.* Another collection of pus formed at the costal margin on the left side, and was believed secondary to a costal osteitis due to brucellosis. The patient recovered in fifteen days and suffered no further complications. Roentgen examination clearly indicated that the abscess in the iliac fossa had its origin in the spine.

The fourth patient presented multiple small abscesses of the sternum and costal cartilages, with fistula resembling those seen in tuberculosis. Following debridement, and curettage, the patient made a rapid recovery. This patient had suffered from continuous intercostal pain following brucellosis, followed by signs of localized inflammation. Bacteriologic study of the pus obtained from these abscesses revealed the *brucella melitensis.*

It has been shown that brucellosis may give rise to inflammatory, hyperplastic, vascular or degenerative lesions, as well as to pigmentary disturbances. It is of importance to keep this in mind in differential diagnosis of tuberculous lesions. The surgical complications of brucellosis respond rapidly to surgery in contradistinction to tuberculous lesions. 9 figures.

THE HEPATORENAL SYNDROME

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J. South Carolina M.A., 39:291-99, Dec. 1943

The clinical picture, pathologic aspects, etiology and pathogenesis of liver death are discussed. The clinical picture of the hepatorenal syndrome, the outstanding features of which are hyperpyrexia and renal suppression with azotemia, is rather characteristic in all instances regardless of the original disease. It appears that hepatic failure occurs first, and, in physiological sequence, the kidneys are secondarily damaged. Thus the body is deprived of its two great sources of metabolite detoxification and excretion. The inevitable result is an overwhelming toxemia and a rapidly progressive general breakdown of the organism. Preexisting liver damage has been given as the main causative factor in liver deaths.

Active therapy in the fully-developed hepatorenal syndrome is, at best, only supportive and symptomatic. Prevention should be attempted. The matter of liver function is too often disregarded by the surgeon in his preoperative appraisal of his patient. Unless subclinical degrees of liver disease are detected by preliminary studies postoperative liver death becomes a real probability. The liver function should be determined not only in cases of biliary tract disease but in all forms of hepatic cirrhosis, tumors of the gastrointestinal tract, cardiac disease, syphilis, hyperthyroidism, diseases of the pancreas and the common systemic ailments of old age. Both the dye excretion test and the Quick hippuric acid synthesis test of liver detoxifying power offer the most satisfactory means of evaluating liver function. When combined with careful clinical study and sound surgical judgment, some degree of hepatic damage can be demonstrated in a high percentage of patients having subclinical liver disease. The Mosenthal concentration method, or one of its modifications, combined with determinations of the blood urea nitrogen, will demonstrate errors in kidney activity.

In the presence of deficient hepatic function, a definite routine of preoperative preparation will go far toward lowering the in-

cidence of the hepatorenal syndrome. The preoperative ideal is the displacement of as much liver fat as possible by glycogen, by feeding large amounts of glucose. Oral administration has distinct advantages over intravenous feeding and should be employed where contraindications to eating are absent. The patient should be hospitalized to permit adequate study by serial Quick tests during the dietary treatment. The following regimen is adequate and represents the total 24-hour intake.

	Weight in grams	*Calories*
Carbohydrates	400	1,600
Proteins	150	600
Fats	20	180
Total		2,380

Between meal servings of rock candy, sweetened fruit juices, crackers with jelly, etc., may be given. According to Ravdin, the protein should constitute approximately 25 per cent of the total calories. When improvement has reached its maximum and the liver function appears stabilized, operation is considered. A high glucose intake must be maintained after operation, alimentary feedings being started as soon as the patient's condition permits. If oral feeding is impossible, intravenous solutions of 5 and 10 per cent glucose in sterile water should be used. Protein can be given in the form of whole blood or plasma and by intravenous administration of amino acids. Nourishment by mouth must be established as soon after operation as circumstances will allow. 2,500 cc. to 3,000 cc. of fluid per 24 hours are needed. If the prothrombin level is below normal, vitamin K and bile salts should be administered, until the prothrombin reaches a normal level. A prompt elevation of the prothrombin level and fibrinogen level of the blood may be obtained by whole blood transfusion aside from its general supportive effect. Minimal trauma to the tissues is essential. Avoidance of cooling the liver by use of warm (not hot) laparotomy pads may be of benefit. A high concentration of oxygen should be used with all inhalation anesthetics. After operation an oxygen tent is of value in preventing the hypoxia to a damaged liver.

Once the syndrome has become established, treatment is entirely supportive and symptomatic. In brief, transfusions of blood, stimulants, oxygen, parenteral fluids, and specific measures pertaining to the type of operation performed constitute the regimen of therapy. Recovery is a remote possibility. Two fatal cases are described in detail. 13 references. 4 figures.

THE USE OF THE COAGULUM-CONTACT METHOD IN SURGERY

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S. Clin. North America, 23:1673-95, Dec. 1943

For the preparation of an adhesive coagulum for use in the coagulum contact method of skin grafting and repair of wounds, 5 cc. of the patient's blood are drawn into a syringe containing 1 mg. of heparin (or an equivalent anticoagulant) dissolved in 1 cc. of Tyrode's solution; the blood is then centrifuged and the plasma drawn off into a separate sterile tube; this is solution A. The leukocytic film which overlies the erythrocytes (the "buffy" coat) is removed with a platinum loop and placed in a tube containing 3 cc. Tyrode's solution and three sterile glass beads. By shaking this tube with the beads the cells of the "buffy coat" are broken down to form a cellular extract—solution B; the cellular debris in the extract does not interfere with its action. For skin grafting, the graft is not moistened, but solution A is applied to the recipient area with a camel's hair brush, and solution B to the under side of the graft, which is then carefully fitted in place. Gentle friction with the forceps after the graft has been in place five minutes will show that adhesion is established. No sutures are employed and no dressings other than single strips of boric acid gauze to protect the area. The coagulum contact method may also be used for the closure of incised or lacerated wounds of the skin and subcutaneous tissues. If there is any stress or tension that prevents bringing the edges of the wound together, sutures are inserted, solution A applied to one edge of the wound

and solution B to the opposite edge; the sutures are quickly tied, drawing the edges of the wound together "with as little disturbance of the coagulum as possible." In experiments on dogs it was found that the coagulum contact method could be used successfully in wounds of the liver, giving "immediate adhesion and hemostasis," but it was less effective in wounds of the spleen. In one case in a man 54 ears of age, in which a biopsy specimen was taken from the liver at a gallbladder operation, bleeding from the cut surfaces of the liver occurred; the incised surfaces were painted with a mixture of the two solutions (A and B) and brought into close contact. Hemorrhage was completely controlled and the patient made a good recovery.

GERMICIDAL ACTIVITY OF ALCOHOL, HYDROCHLORIC ACID AND ALUMINUM POTASSIUM SULFATE; THEIR EFFECT ON CUTANEOUS FLORA

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Arch. Surg., 47:468-77, Nov. 1943

In experiments to determine the germicidal action of various solutions against skin bacteria, with regard to their effectiveness for the preparation of the surgeon's hands before operation, it was found that alcohol in a 70 per cent concentration (by volume) was the most effective germicidal agent for skin bacteria. However, a 0.5 per cent hydrochloric acid solution was also a "highly efficient" germicide against these bacteria although not quite equal to 70 per cent alcohol. Aluminum and potassium sulfate in 10 per cent aqueous solution was found to "harden" the skin so that the bacteria on the skin were "imprisoned" but not killed. Any procedure that would soften the skin, such as the wearing of rubber gloves, would therefore release these bacteria. On the basis of these findings, the authors conclude that a 0.5 per cent solution of hydrochloric acid is a sufficiently efficient germicide to be used in the preparation of the surgeon's hands before operation, and that its use for this purpose would "conserve the supply of alcohol for more essential purposes."

THE USE OF METHEDRINE IN SURGICAL OPERATIONS; CLINICAL STUDY ON AN EFFECTIVE PRESSOR DRUG

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Surg., Gynec. & Obst., 77:645-56, Dec. 1943

In a series of 130 surgical operations of various types, 54 patients showed "an unduly low" systolic or pulse pressure and signs of impending surgical shock. The effect of the administration of methedrine on the blood pressure has been studied. These operations were performed in four general hospitals under "average operating conditions." The anesthetics employed included spinal anesthesia with 1:1500 to 1:2,000 nupercaine, sometimes supplemented by gas-oxygen, gas-oxygen-ether, or pentothal; various general anesthetics, including gas-oxygen-ether, open ether and trichlorethylene; local anesthesia with amethocaine 1:1,000, sometimes supplemented by general inhalation anesthesia or pentothal, and pentothal, alone or with inhalation anesthesia. Methedrine was found to have a pressor effect when given subcutaneously, intramuscularly or intravenously. With subcutaneous injection, its action is delayed; with intramuscular injection, its action on blood pressure is evident within approximately five minutes; with intravenous injection its action is immediate. In the 54 cases studied methedrine was given by intramuscular injection, or by a combined intravenous and intramuscular injection. In minor operations, such as repair of hernia or ligature and injection of varicose veins, 15 to 20 milligrams of methedrine were given by intramuscular injection if the systolic blood pressure fell to 80 mm. or the pulse pressure to 10 to 15 mm. If the systolic pressure fell below 80 mm., 25 milligrams of methedrine were given. In major operations when the systolic blood pressure fell below 80 mm. 25 to 30 milligrams of methedrine were given either as a single dose intramuscularly or 10 to 15 milligrams intravenously and 15 to 20 milligrams intramuscularly. If the systolic blood pressure fell to 60 mm. or below 15 to 20 milligrams were given intravenously and 15 to 20 milligrams intramuscularly; only 2 patients were given the maximum dose of 20 milligrams intra-

venously plus 20 intramuscularly. In 10 cases more than one injection of methedrine was given, when the initial injection did not cause a rise of blood pressure in twenty minutes. In some of the earlier cases in this series the initial dosage used was too small, and subsequent experience showed that this was the case in 4 of these 10 cases, so that only 6 patients really needed more than one injection to induce a sufficient rise in blood pressure. Three injections were given in 3 cases; in one case (a radical mastectomy) small doses were used "deliberately" in order to keep the blood pressure at a low normal level without the risk of hemorrhage from the wound. The largest total dose of methedrine used (in three injections) was 75 milligrams; no untoward effects were noted. When a carefully calculated intramuscular dose or a combined intramuscular-intravenous dose of methedrine was given, the effect on blood pressure was usually maintained for several hours. There was only one case in the 54 cases studied in which methedrine failed to restore and maintain the systolic blood pressure to at least 100 mm. The average maximum of systolic blood pressure following the administration of methedrine was 135 mm., which "settled" to an average minimum of 124 mm. No abnormally high rise occurred when the dosage was adjusted to the patient's condition, evaluated on the basis of age, physique, blood pressure, color, temperature and respiration. On the basis of their findings in this series of cases the authors consider methedrine to be superior to adrenalin and ephedrine as a pressor agent.

A NEW TECHNIQUE FOR INTRAMEDULLARY INFUSIONS

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M. Bull. Vet. Admin., 20:161-63, Oct. 1943

In some cases in which intravenous infusions of blood or saline solution are indicated, no suitable vein can be found; in such cases intramedullary infusion can be used to advantage. The authors have used this method especially following thoracoplasty.

The manubrium sterni is used for the site of the infusion. A 1 per cent novocain solution is used for local anesthesia; then a skin incision is made down to the bone with a sharp-pointed knife. A drill is used to make an opening in the cortex of the bone; after this opening is started, the drill is turned to make a 30° angle with the sternum; when the drill pierces the cortex, a "give" is felt. The drill is removed and a 15-gage needle with a smaller inner needle is easily pushed into the marrow at a 30° angle; the inner needle is necessary to prevent clogging. Before any infusion is begun, aspiration is done with a 10 cc. syringe; then the infusion is begun immediately. Saline solution can be easily introduced into the bone marrow; but some pressure is necessary to introduce whole blood. For this purpose the authors employ a Hirsch-Adams ball-valve outfit; if the rate of infusion does not exceed 20 cc. a minute patients rarely experience any discomfort. As many as six marrow transfusions have been done over the same area in the same patient without any ill effect. The procedure causes no pain and the wound heals well with little or no visible scar.

A CAUTION AGAINST TOO LIBERAL USE OF CITRATED BLOOD IN TRANSFUSION

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Arch. Surg., 47:319-25, Oct. 1943

Some of the authors' recent experiences suggest the possibility of an overdosage of sodium citrate if citrated blood is given in large quantities. One of their patients died without any definite cause after having been given 4000 cc. of citrated blood in six hours following a revision thoracoplasty. When the transfusion of citrated blood was first introduced by Lewisohn in 1915, the toxicity of sodium citrate was recognized and it was recommended that not more than 5 gm. be used for any one transfusion. In recent years, the broadening of the indications for blood transfusion in major surgery, and the recognition of its value in the treat-

ment of shock and hemorrhage have led to "a more frequent and quantitatively greater use" of citrated blood and to its more rapid injection. In experiments on dogs it was found that animals bled repeatedly and given transfusions of citrated blood survived a much shorter time than those given transfusions of heparinized blood. This is best explained as due to the toxic action of the large amounts of sodium citrate employed, although "very little light can be thrown on the mechanism of this action." On the basis of the findings in these experiments on dogs, a man weighing 70 kg. would have to be given 6,300 cc. of blood, containing 0.6 per cent sodium citrate, within a few hours. A concentration as high as 0.6 per cent sodium citrate is not in general use for blood transfusion at present, but with the introduction of blood banks, the concentration of citrate often is increased to 0.5 per cent or higher. Patients for whom the administration of large amounts within a few hours is indicated are usually desperately ill; this may decrease their tolerance to sodium citrate. Amounts of 2,000 to 3,000 cc. of citrated blood have been given within a few hours without any apparent ill effect. However, the authors' experience leads them to warn against the "too-liberal use" of citrated blood for transfusion. In cases in which the administration of large amounts of blood within a few hours is indicated, they believe some other method should be used.

TECHNIC OF INTRAVENOUS INJECTION IN INFANTS

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Illinois M.J., 84:323-24, Nov. 1943

Giving a transfusion to an infant is not difficult, if the method and apparatus used are subordinated to the successful insertion of a needle into a vein and maintaining it there. Two technics are available, the less certain method of penetration of the skin and vein with a sharp needle, and the more reliable method of exposure of the vein by dissection and entering with a blunt needle. The percentage of failure by the first or sharp method

varies directly with the skill and experience of the operator. It is more likely to fail than succeed except in the hands of practiced operators because of the great difficulty experienced in entering the vein and holding the needle in place. The technic is described in detail.

The second method actually exposes the vein by dissection and then threads it with a blunt needle. The vein most commonly used for this method is the small saphenous vein just anterior to the internal malleolus. It cannot always be seen, but can be felt by drawing the thumb firmly across its course. It is not always present. After the vein has been located, the ankle is restrained by taping the foot in external rotation to a padded splint with one inch adhesive tape. The tape is applied to the underside of the splint at the heel side. It passes up and over the heel over the medial aspect of the foot and toes, and down and around the underside of the splint, around once more to the heel side over the instep, and down and around to be secured on the underside of the splint. The assistant seated alongside the baby holds the splint down on the table, thus immobilizing the splint and thus the foot. The site of operation is prepared with iodine and alcohol. The adhesive tape immediately adjacent is also liberally sponged with the solution. When the vein's position is definitely known, a local anesthetic is injected directly over the center of the vein. The wheal raised obliterates the vein, but the needle mark then acts as a marker, accurately locating the underlying vein. Two towels are used as sterile drapes, the lower edge of the first just touching the needle mark, and the upper edge of the second towel touching the needle mark, thus forming the upper and lower half of the field. The towels are then fixed to the splint with towel clips on either side of the leg. By folding under the edges of the towels over the vein, the small area needed for the transfusion will peep through. A sharp No. 11 Bard-Parker knife is used to make a small incision transverse to the vein, between one-eighth to one-quarter of an inch long. It is made across the course of the vein and directly through the needle mark. The wound is spread with a forceps and the vein is scooped up with an iris forceps. A piece of catgut is passed under the vein by catching it in the free end of the forceps. This is to help lift the vein out of the

wound. A small opening is cut in the vein wall with the sharp pointed iris scissors after fat and adventitia have been cleaned from it. Through this opening a blunt No. 22 or No. 20 needle is made to slip into the vein. To secure the needle in position and prevent its being pulled out, a forceps with a notched tip is clamped on the needle catching the vein and needle in its jaws. Any method or apparatus may then be used to complete the transfusion. At its completion the vein is tied off and no sutures are used to close the incision. A tight pressure bandage controls bleeding. For continuous infusion, the needle is tied in place with a dermal ligature and the needle and cannula are taped securely to the skin of the ankle.

Discussion by Dr. F. W. Schultz of Chicago, Dr. W. L. Crawford of Rockford, Ill., Dr. Robert A. Black of Chicago, Dr. G. M. Cline of Bloomington, Dr. W. M. Larson of Stockton, Dr. Maurice Blatt of Chicago and Dr. Donald E. Cassels of Chicago.

VITAMIN K IN TONSILLECTOMY GRANULATION OOZING

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Ohio State M.J., 39:1116, Dec. 1943

If vitamin K is deficient or at a border line status at the time of operation, the posttonsillectomy fasting, particularly in adults and older children, would increase this deficiency. Avitaminosis K of various degrees could thus cause granulation oozing, plus the throat trauma, such as coughing, expectoration, swallowing coarse food and so on. The operation clotting time has no relation to the oozing. A prescription is therefore given the patient as follows: Rx. Vitamin K (menadione) 2 M/G tablets xxx Sig.: One tablet twice a day until all tablets are taken. The verbal directions are: Start three days before operation and continue the day after operation until all are taken. Hypodermic medication may be used if immediate operation is planned. A check of 235 cases given vitamin K showed one case oozing five days after operation, but it had stopped by the time the patient reached the office.

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